TAPR Spread Spectrum Special Interest Group Archive, November 1995 through December 1996

November 1995 through December 1996

TAPR's technical forum for applying spread-spectrum communications to amateur packet-radio networking, including chipsets and modems, Part 15 wireless LAN hardware, direct-sequence and frequency-hopping systems, CDMA, interference, shared spectrum, and development projects.

This volume contains 13 original monthly files and 688 messages, arranged chronologically. The PDF is a readable access copy: MIME transfer encodings are decoded, HTML bodies are converted to plain text, and non-text attachments are represented by descriptive notes. The raw source text is supplied separately with the Internet Archive item.

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November 1995

Original source file: ss.9511
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9511

1. Harris PRISM Chipset

From: srbible@mindport.net (Steven R. Bible)
Date: Wed, 29 Nov 1995 12:44:43 -0500
To: ss@tapr.org
Message-ID: <199511291744.MAA02441@polaris>
Rendered body type: text/plain

Here is some really good information sheets on Harris' PRISM DSSS 2.4 GHz chipset. The URL is:

  http://www.semi.harris.com/datasheets/wireless/wireless_family.html

73,

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

---

2. Welcome!

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Wed, 29 Nov 1995 23:29:46 -0500 (EST)
To: ss@tapr.org
Message-ID: <199511300429.XAA30367@hydra.carleton.ca>
Rendered body type: text/plain

Now that Steve has broken the ice, time to declare this mailing list officially open! To set the stage, the following is the welcome message which will henceforth be sent to new subscribers. Gentlemen (and ladies, one would hope), start your engines...

Welcome to the TAPR Spread Spectrum SIG! This mailing list is for the discussion of topics related to the application of spread spectrum communications technology to amateur packet radio networking. The emphasis of this SIG is on the technology of spread spectrum rather than regulatory or political issues. Suitable topics include:

- New SS chipsets and modem products, and their applicability to the amateur service

- Performance reports on existing products (e.g., Part 15 WLAN devices)

- Relative merits of direct sequence, frequency hopping and hybrid approaches in amateur SS applications

- Use of CDMA and other multiple access techniques to build packet radio LANs/MANs

- Dealing with shared allocations and interference in the UHF and higher amateur bands

- Proposals for development projects in amateur packet SS

- Sources of SS information on the Internet and elsewhere: books, articles, web pages, FAQ files, etc

The TAPR SS SIG is unmoderated. We would like to keep it that way, to encourage the open exchange of ideas and minimize the turnaround time. This will only be possible if the participants exercise some restraint. Discussions of technical issues can get heated at times, but they are not useful unless they also shed some light on the topic. Personal attacks will not be tolerated, and may result in the offender(s) being summarily removed from the list.

Maintainer of the SIG is Barry McLarnon, VE3JF. Please direct comments and suggestions to bm@hydra.carleton.ca or ve3jf@tapr.org.

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: barry@va3tcp.ampr.org
  Packet Working Group | FreeNet: aa187@freenet.carleton.ca

3. IMEC Launches New Range of Spread Spectrum ASICs for Wireless Communications

```
From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Thu, 30 Nov 1995 03:36:54 -0800
To: dewayne-net@warpspeed.com (Dewayne's Wireless News List),
        ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v0214070bace346134235@[204.118.182.22]>
Rendered body type: text/plain
```

IMEC Launches New Range of Spread Spectrum ASICs for Wireless Communications

Source: Business Wire

SUNNYVALE, Calif.--(BUSINESS WIRE) via NewsPage -- Earlier this month, it was announced in Europe that IMEC has developed a range of flexible direct sequence spread spectrum ASICs, for use in satellite communications and terrestrial networks. The devices have been developed in collaboration with SAIT Systems, a Belgium telecom company, and the European Space Agency.

The family of spread spectrum chips currently available aims at niche markets where highly reliable wireless communications are required, such as industrial networks for monitoring and control.

The Programmable Mobile Communications Modem (PMCM) is a digital transceiver chip integrating baseband and IF functionality with very low implementation loss. Fully programmable spreader and correlator functions, band-limiting oversampling filters and IF up-and down-converters are on chip. The ASIC can process 10 Mchips/s and incorporates an interface for an external processor for the application-dependent functionality. The PMCM encapsulates a complexity equal to 95,000 gates.

The PMCM provides a low cost and highly-miniaturized solution for applications such as VSAT communications and terminals for Private Mobile Radio networks via satellite. Code lengths of up to 1024 are supported. The high processing gain also makes the PMCM a versatile key component for wireless LAN applications where robustness of the link is crucial, such as in industrial environments with high and unpredictable interference levels.

The Advanced Spread spectrum Transceiver ASIC (ASTRA) is a high speed, low power version of the PMCM, providing 15 Mchips/s, parallel demodulation of 4 channels and a 32-bit interface to a host processor.

The Direct Sequence Integrated Receiver with ARM (TM) Core (DIRAC) chip combines flexible and highly integrated IF receiver chain with an on-chip 32-bit ARM microprocessor core. Cost effective spread spectrum receivers, for satellite services for example, can be built using this device.

A spread spectrum development kit built around the PMCM allows users to explore programmable parameter ranges and to determine the parameter set tuned towards a particular application.

A rapid design turnaround cycle - in the order of weeks - towards customized components is possible due to the modular architecture of the devices and the advanced CATHEDRAL CAD environment developed at IMEC. Specification, synthesis and simulation at different abstraction levels are all provided in an integrated toolbox. A link with the Synopsys, Inc.'s (Mountain View, CA) design tools ensures compliance with industrial standards of ASIC design. The design path is open to any foundry.

A current development is the integration of digital, and analog modem components in an MCM (Multi-Chip Module) package, which enables further reductions in size and cost.

The next generation of ASICs will concentrate on high-speed operation for markets such as wireless LAN, wireless multimedia and wireless office products.

Pricing and Availability

Evaluation ASICs are available within 30 days. Production quantity are available in 90 to 100 days ARO. Pricing is between $110 to $270 US and depends on type and quantity ordered.

The development kit is available in Q2 '96 and is priced at $4500 US.

About IMEC:

IMEC was founded in 1984 and today is the largest independent research and development center of its kind in Europe. IMEC employs over 500 people. Its 36,000 sq. ft. clean room is dedicated to advanced research and development into semiconductor processing technologies. Its nearly $60 million revenue is derived from agreements and contracts with government agencies, aerospace and semiconductor industry companies worldwide.

IMEC Contact information:

In Europe: Patrick Pype, IMEC, 75 Kapeldreef, B3001 Leuven, Belgium - Tel.: (+32) 16 28 12 11-Fax: (+32) 16 22 94 00

In the U.S.: William vanCleemput, Delos Research Group, 333 Maude Avenue, Sunnyvale, CA 94086 - Tel.:(408) 733-8000 - Fax: (408) 733-8008 - EMAIL: 72740.2015@compuserve.com

NOTE TO EDITORS: ARM is a trademark of Advanced RISC Machines Ltd.

CONTACT: IMEC, Belgium | Marianne Van den Broeck, +32 16 281 491 | FAX: +32 16 281 637 | or | IMEC Public Relations Counsel, United States | Georgia Marszalek, 415/345-7477 | FAX: 415/341-0388 | EMAIL: georgia@netcom.com

[11-29-95 at 11:17 EST, Business Wire]

Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! AOL: HENDRICKS
Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
---

4. Re: [SS:2] Welcome!

From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Thu, 30 Nov 1995 08:42:10 -0800 (PST)
To: ss@tapr.org
Cc: ss@tapr.org, bburns@ridgecrest.ca.us
Message-ID: <Pine.OSF.3.91.951130083218.1043B-100000@biggulp.callamer.com>
Rendered body type: text/plain

What a nice welcome message! Let me suggest we start out with a good bibliography of SS references. Most of us are aware of the QEX submission and the reprint in the PSR, but in order to come to speed we need something like a AMRAD anthology!
     By the way, I was given the number (703)734-1387 as the AMRAD BBS. It is not! That is a private residence. 73 Cliff Buttschardt W6HDO

5. Re: [SS:3] IMEC Launches New Range of Spread Spectrum ASICs for Wireless Communications

From: srbible@mindport.net (Steven R. Bible)
Date: Thu, 30 Nov 1995 11:24:26 -0500
To: ss@tapr.org
Message-ID: <199511301624.LAA09409@polaris>
Rendered body type: text/plain

>The development kit is available in Q2 '96 and is priced at $4500 US.

Oooouuucchhh!!! $4500.00 !!!

I'd put my money on the Loral EB200 at $2500.00. I believe it's available now.

Loral
Communications Systems Division
640 North 2200 west M/S F1F12
Salt lake City, UT 84116

Phone: 801-594-3737
Fax: 801-594-4127

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

6. Re: [SS:5] Re: IMEC Launches New Range of Spread Spectrum ASICs for Wireless Communications

From: jerryn@ici.net (Jerry Normandin)
Date: Thu, 30 Nov 95 14:50:35 EST
To: ss@tapr.org
Message-ID: <9511301950.AA28429@ici.net>
Rendered body type: text/plain

Hello everyone.

I built up four Spread Spectrum Modems. They are using an OEM Proxim Module. I picked them up so I can finish my modified X.25 packet driver for unix. I'm designing it for free wireless internet access. Also are there any decent books on Spread Spectrum Technology and Data Pumps? I would like to go with my own Data Pump and Radio. Right now the interface, custom firmware, and Software is my design. Since computers fast compared to standards set a few years ago we have plenty of cpu time left to decompress datapackets. The only data not compressed are certain X.25 commands and the destination addresses.... all other data All other data is compressed with my compression. It opens up some bandwidth.

Now I would like to get some range. Are there any high speed switching amplifiers (3ns or so). I am operating in the 902-925Mhz band.

I was impressed with the range I could get by decoupling the heck out of my interface and Proxims stuff. I also filtered the heck out of the power supply. I was able to get 5,000ft with a 5/8 wave dipole. I would like to get 10miles if possible.

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7. Re: [SS:4] Re: Welcome!

From: Greg Jones <wd5ivd@tapr.org>
Date: Thu, 30 Nov 1995 14:35:14 -0600 (CST)
To: ss@tapr.org
Message-ID: <199511302035.OAA14940@sys1.tapr.org>
Rendered body type: text/plain

There is a large and growing ref list as part of the Amateur Spread Spectrum page. http://www.tapr.org/ss

We should be including Daryl Smiths Thesis on there shortly and also Steve is working on some new stuff to add to thje ref area.

Cheers - Greg, WD5IVD

>
> What a nice welcome message! Let me suggest we start out with a good
> bibliography of SS references. Most of us are aware of the QEX
> submission and the reprint in the PSR, but in order to come to speed we
> need something like a AMRAD anthology!
> By the way, I was given the number (703)734-1387 as the AMRAD BBS.
> It is not! That is a private residence. 73 Cliff Buttschardt W6HDO
>
>

December 1995

Original source file: ss.9512
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9512

1. New Page on the www.tapr.org/ss

```
From: Greg Jones <wd5ivd@tapr.org>
Date: Fri, 1 Dec 1995 00:36:50 -0600 (CST)
To: ss@tapr.org, tapr-bb@tapr.org (TAPR-BB mailing)
Message-ID: <199512010636.AAA10376@sys1.tapr.org>
Rendered body type: text/plain
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Darryl Smith, VK2TDS, has allowed us to put his Thesis Page on "A Spread Spectrum Packet Radio Network" on our the Amateur Spread Spectrum Web Page. The report was submitted in partial fulfilment of the requirements for the degree of bachelor of engineering (UTS) in Electrical Engineering. Academic Supervisor: A/Prof. Sam Reisenfeld. UNIVERSITY OF TECHNOLOGY SYDNEY, SCHOOL OF ELECTRICAL ENGINEERING

http://www.tapr.org/ss

The HTML page is a little large and we might have a split up page version later when there is some time.

Lots of good information and a whole new set of references in the document.

Cheers - Greg, WD5IVD

---

2. Comparison of DSSS and FHSS - FYI

```
From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Fri, 1 Dec 1995 10:10:22 -0800
To: dewayne-net@warpspeed.com (Dewayne's Wireless News List),
        oldcolo-nsf@warpspeed.com (Old Colorado Wireless NSF Grant List),
        ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140705ace4f4ad61cf@[204.118.182.22]>
Rendered body type: text/plain
```

[Note: I got this from the Solectek website at <http://www.solectek.com/>. They make Part 15 wireless data gear.]

Tech Tips, Dec. '95

While enjoying the serenity of radio silence and cooking the family turkey for the Thanksgiving dinner in a microwave oven (see last month's Tech Tips), I thought I should sneak in a more controversial topic for December, the silly season. The topic is the wireless LAN FHSS (Frequency Hopping Spread Spectrum) and DSSS (Direct Sequence Spread Spectrum) technology comparison. No, no...I shall not be biased by Solectek's own DSSS product offerings. In a technology judgment, one can't take the fifth amendment. Right? You are the judge and jury.

Just to be overwhelmingly fair, I shall talk about the bad things in DSSS first. Current 2 Mbps DSSS products in the market place occupy 22 Mhz of bandwidth at the first nulls of the main signal lobe. FHSS, on the other hand, does it within 1 Mhz of bandwidth as a consequence of FCC mandate. As a result, the circuit design for the DSSS products requires a very good passband characteristics for 22 Mhz wide. If there is a choice of 1 Mhz versus 22 Mhz, any good old non-masochistic RF engineer would shy away from 22 Mhz passband design any day of the year.

DSSS is typically chipped using BPSK modulation. BPSK modulation has both phase and amplitude information and thus linear amplification is necessary. What that means is that only Class A or Class AB amplifiers can be used. These are relatively low efficiency amplifiers. A lot of the DC power is turned into thermal energy which has to dissipate. FHSS is typically using CPFSK modulation. This is a constant envelope modulation and thus non-linear high efficiency Class C amplifier is adequate for its use. For that matter, the entire transmit and receive chains can be non-linear as well, whatever that may be. It transpired that DSSS is more power hungry and harder to build in a smaller enclosure than FHSS.

In an indoor radio propagation environment, the measured delay spread statistics have shown that 100 nSec delay is reasonably common. This is close to the chipping rate of DSSS. This means a potential for inter-chip-interference, or in other words, a penalty for performance that may be as much as 10 dB over corresponding Gaussian Channel in our

experience. Good diversity antennas must be used to overcome some of these problems. There have been arguments that RAKE or equalization implementation may turn this delay phenomenon into an advantage for DSSS, as it has for IS-95 CDMA. But honestly, give me a break, I don't see anyone doing RAKE at 10 Mega Chip for this market any time soon. I certainly don't have any such plans. FHSS folks rest easy and they don't see the effects of the 100 nSec delay even if they tried.

For a strong narrow band jammer environment FHSS also has a marked advantage, if it can avoid the jammed channel. Otherwise, FHSS will still degrade its performance gracefully. DSSS on the other hand will simply roll over belly-up. However, in a low broadband interference case, FHSS will roll over dead more than 10 times sooner. This is because FHSS requires a higher over the air signal flux density than DSSS to stay healthy. This explains the observation that FHSS dies sooner than DSSS near a microwave oven.

Now that I have trashed the DSSS completely, let me see if I can even up the score just a little with bad things in FHSS.

The FCC rule limits the 20 dB bandwidth of a hopping channel to be 1 Mhz wide. To achieve comparable DSSS data speed will require FHSS to use M'ary modulation, where "M" here is a big time Mighty Mary "M." The implementation difficulty is exponential. Furthermore the required Eb/No is greatly increased for the same BER and hence the range is greatly reduced. To compound the problem, FHSS has to give up inter-hop synthesizer settling time and demodulator lock-up time where no data transmission can be done.

FHSS is also forced to hop within 0.4 sec. It has to use no less than 75 channels. All this mumbo jumbo means that it very tough to get a high speed FHSS that does more than 1-2 Mbps and if you do, you PAY for it! DSSS on the other hand can do high data speed relatively easily. 10 Mbps DSSS in the 2.4 Ghz band is now available. I think I can fit 20 Mbps DSSS in this band without too much trouble.

FHSS has only 1 Mhz bandwidth per hop. DSSS can utilize full bandwidth. Thus DSSS has more frequency diversity protection against frequency select fading phenomenon. I know I am hand waving here, but in real life, 10 Mhz fading statistics is markedly superior over 1 Mhz.

As far as power control discussion is concerned, everybody has been over sensitized with CDMA near-far problems. I contend that this problem has minimum effect here. All the 2.4 Ghz roaming adapter products use half-duplex method, and they do CSMA/CA in a time division manner with the access points. The only near-far problem is a "capture" effect where a stronger station always win the spectrum. This goes for both DSSS and FHSS. I think I am going to get roasted on this one.

As you can see I am bending over backwards to be fair to both technology camps, if not over compensating for the FHSS guys. To summarize on this rather long winded discussion, you can safely say the following:

1. DSSS is much harder to build, and may cost more. It should always have the data speed and range advantage.

2. FHSS is easier to build and therefore cost less. It is slower in data speed and shorter in range.

Of course, here I'm hand waving again......

-jc

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Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
---

3. Article on interference potential of microwave ovens - FYI

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Fri, 1 Dec 1995 10:14:01 -0800
To: dewayne-net@warpspeed.com (Dewayne's Wireless News List),
oldcolo-nsf@warpspeed.com (Old Colorado Wireless NSF Grant List),
ss@tapr.org (TAPR SS Mailing List)

Message-ID: <v02140706ace4f5e8abb3@[204.118.182.22]>
Rendered body type: text/plain

[Note: I got this from the Solectek website at <http://www.solectek.com/>.
They make Part 15 wireless data gear.]

Tech Tips, Nov. '95

This month, we shall tackle the issue of the interference potential that microwave ovens pose to wireless LAN operations in the 2.4 GHz ISM band.

First, we need to examine the nature of the microwave oven interference. Before we get into it, though, I'd like to digress a little. When I originally looked at this problem in 1989 for IEEE 802.4L committee, I was told of reports from research labs that microwave oven interference consisted of a very pure CW tone at about 2.45 GHz. I was also told that they had measured broadband noise interference of over 100 MHz. The conflicting results prompted me to do some measurements of my own. The end results I got convinced me that both were correct (I should be a diplomat....).

A microwave oven emits a single CW tone on a 50% duty cycle, 8.3 mSec on and 8.3 mSec off. This, by the way, is because they run on a 60 Hz main power (OK, ok, 1/60=16.7 mSec, and so half of 16.7 is 8.3 mSec). During the ON time, the CW tone flickers on and off rapidly like a fluorescent tube. There are zillions of possibilities during the ON period. It may flicker rapidly throughout the ON period, or it may flickers a few times then stay on for the duration. Knowing this, you see the problem that the poor guy who tries to measure this phenomenon faces. Measuring pulsing emission is always a pain even under the best circumstances. The impulse bandwidth characteristics of your measuring instrument, the resolution filter of the measuring instrument's front end, the time/frequency duality of poor Mr. Fourier, the sweep time, etc. are enough variables to drive a sane person nuts. To make a long story short, the rapid flickering which can have a rise and fall time of about 10 nSec causes the broadband noise spread. So there you have it, if the tone stays on for some time, and you are smart enough to catch it on your measuring instrument, you can see a very nice clean CW tone - hint: use DSP techniques. When it flickers, you have a nice passband spectrum plot of your trusty microwave oven's magnetron cavity.

Now, if you have 2 or 3 phase main powers, and your microwave ovens are on different phases, then - tough luck, you lose the quiet "OFF" period of the microwave ovens. But there is a way to keep the emission low. The emission power is much less if the oven is loaded. To achieve reasonable radio silence, simply put a 5 lb turkey to cook in each microwave oven.

IEEE802.11 MAC has an optional provision to keep clear of the 8.3 mSec ON time, by using a software "primitive" called CCA (Clear Channel Assessment). You can opt not to transmit when CCA is False. However, my experience is that microwave oven interference potential is generally over-rated. The flux density of the interference is not that powerful in most cases. My advice is to simply move away from the oven - with a good wireless LAN adapter, even a distance as little as ten feet will allow a wireless connection that has imperceptible performance degradation.

See you next month - jc

Further readings:

J.Y.C. Cheah, "Interference Characteristics of Microwave Ovens in Indoor Radio Communications", Proceedings of IEEE/IEE PIMRC' 91 London UK, pp. 280-285, September, 1991.

J.Y.C. Cheah, "IEEE 802.4L submission on microwave oven interference measurement", Doc: IEEE p802.4/90-08a., February, 1990.

Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
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Fremont, CA 94539-3204   ! AOL: HENDRICKS
Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
---

4. Zilog Spread Spectrum Chip

From: "Steven R. Bible" <srbible@mindport.net>
Date: Sat, 09 Dec 1995 14:41:00 -0500
To: ss@tapr.org
Message-ID: <30C9E64C.1BBC@mindport.net>
Rendered body type: text/plain

I stumbled onto this pdf file on the web:

Z87200 Spread-Spectrum Product Description

    http://www.zilog.com/wireless/Z87200.pdf

The Zilog wireless page is:

    http://www.zilog.com/wireless/wireless.html

73,

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org
[Attachment: pursuit; text/html; 6,497 bytes]

5. Zilog Wireless Evaluation Kits

From: "Steven R. Bible" <srbible@mindport.net>
Date: Sat, 09 Dec 1995 15:07:51 -0500
To: ss@tapr.org
Message-ID: <30C9EC97.1312@mindport.net>
Rendered body type: text/plain

Found this also:

    http://www.zilog.com/thirdper/wireles2.html

Zilog has two evaluation kits. The Z8700001ZC0 - a cordless telephone chipset evaluation unit, and Z8720000ZC0 - a spread spectrum evaluation unit.

I have no idea as to their cost.

73,

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org
[Attachment: wireles2.html; text/html; 1,071 bytes]

6. New SS News related website - FYI

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Sat, 16 Dec 1995 08:18:40 -0800
To: ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140a15acf8a12597f0@[204.118.182.22]>
Rendered body type: text/plain

SS Gang:

        Spread Spectrum Scene now has a website. Below is some info on the site:

The only publication dedicated exclusively to the art and science of Spread Spectrum digital communications, Spread Spectrum Scene (aka SSS) is targeted for the Spread Spectrum professional and is committed to being the primary source for the latest news and information about the growth, regulation, and opportunities in this emeging science.

Spread Spectrum Scene presents industry news, new product information and applications solutions in an easy to read, concise format. Technical contributions and user oriented articles are welcomed. News and press releases will also be published on a space and time available basis.

SSS is presented as a service of RF/Spread Spectrum (aka RF/SS), a leader in the custom development of RF, Digital Data Communication and Spread

Spectrum Products.

        Check out their site at:

                        <http://www.sss-mag.com/>

-- Dewayne

Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
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Fremont, CA 94539-3204   ! AOL: HENDRICKS
Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
----

7. Re: [SS:13] New SS News related website - FYI

From: Greg Jones <wd5ivd@tapr.org>
Date: Sat, 16 Dec 1995 12:05:12 -0600 (CST)
To: ss@tapr.org
Message-ID: <199512161805.MAA19057@sys1.tapr.org>
Rendered body type: text/plain

Looks like they have a lot of work to do before the pages are fully
operational.

Cheers - Greg

>
> SS Gang:
>
>   Spread Spectrum Scene now has a website. Below is some info on the
> site:
>
> The only publication dedicated exclusively to the art and science of Spread
> Spectrum digital communications, Spread Spectrum Scene (aka SSS) is
> targeted for the Spread Spectrum professional and is committed to being the
> primary source for the latest news and information about the growth,
> regulation, and opportunities in this emeging science.
>
> Spread Spectrum Scene presents industry news, new product information and
> applications solutions in an easy to read, concise format. Technical
> contributions and user oriented articles are welcomed. News and press
> releases will also be published on a space and time available basis.
>
> SSS is presented as a service of RF/Spread Spectrum (aka RF/SS), a leader
> in the custom development of RF, Digital Data Communication and Spread
> Spectrum Products.
>
>   Check out their site at:
>
>   <http://www.sss-mag.com/>
>
>
> -- Dewayne
>
>
> ---
> Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
> Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
> 43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
> Fremont, CA 94539-3204   ! AOL: HENDRICKS
> Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
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>
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>
>
>

8. ARLB112 Spread spectrum changes

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Wed, 20 Dec 1995 13:01:48 -0800
To: ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140a00acfe2a1f7873@[204.118.182.22]>
Rendered body type: text/plain

ZCZC AG79
QST de W1AW
ARRL Bulletin 112 ARLB112
>From ARRL Headquarters Newington CT
Relayed by KB8NW/OBS & BARF-80 BBS
December 19, 1995
To all radio amateurs

SB QST ARL ARLB112
ARLB112 Spread spectrum changes

The ARRL has asked the Federal Communications Commission to relax its spread-spectrum regulations to give Amateur Radio more opportunity to contribute to spread-spectrum development. The League's petition for rulemaking, filed in December, seeks relaxed restrictions on spreading sequences and greater flexibility in spreading modulation. The spread-spectrum technique, which distributes information among several synchronized frequencies within a band at the transmitter and reassembles the information at the receiver, was first approved for Amateur Radio in 1985 for bands above 225 MHz, and there has been some experimental amateur operation since then.

The petition proposes that the FCC permit brief test spread-spectrum transmissions and allow international spread-spectrum communications between amateurs in the US and those in countries that permit hams to use spread-spectrum techniques. The current rules allow only domestic communication. The petition also asks for automatic power-control provisions to insure use of minimum necessary power to conduct spread-spectrum communication and limit the potential for interference to narrowband modes. The petition does not ask for any changes in frequency restrictions on SS emissions, the 100 watt power limit or logging and identification requirements.

In urging the FCC to adopt the changes, the League's petition calls the proposals the minimum necessary changes in order to foster SS experimentation in the Amateur Service.

Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! AOL: HENDRICKS
Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/

---

9. SS Questions

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sun, 31 Dec 1995 15:59:02 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199512311559.PAA01384@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

I've been collecting info on the various SS wireless LAN products, particularly those which can do >100 kbps. I'm capturing the data in a spreadsheet, and when I get a little further along, I'll HTML'ize it and make it available on the Web. I may be reinventing the wheel here, but so far I haven't come across any compilation of product info like this... if anyone knows of one, a pointer would be appreciated. The URL http://pasture.ecn.purdue.edu/~laird/Electronics/wireless-modems/ has a bit of relevant info, but it's very incomplete... I'm trying to do a much more comprehensive survey (and in '96, to get my hands on some of the hardware!).

I'm curious as to what distances have been achieved with these unlicenced WLAN systems over good (and not so good) LOS paths. I know that there are wireless bridge products that can span considerable distances (e.g., from Cylink), but they tend to be very expensive. What about the lower-cost products such as the WaveLAN cards? Anybody with some real-world experience with outdoor links out there? (Yes, I'm aware of Lew Shannon's tests over a half-mile path).

Another thing which interests me is the MAC layer implementations used in these products. As far as I can tell, nearly all of these products are half-duplex (again, Cylink being an exception) and use CSMA. I know that WaveLAN uses CSMA/CA, but I've not found any details on its CA implementation... are the strategies used similar to those proposed in the IEEE 802.11 draft? Are there any existing or proposed unlicenced

WLAN products which use CDMA?

Barry

--
Barry McLarnon VE3JF/VA3TCP
Ottawa Amateur Radio Club Packet Working Group
Email: bm@hydra.carleton.ca or bm@lynx.ve3jf.ampr.org

10. Re: [SS:16] SS Questions

From: "Steven R. Bible" <srbible@mindport.net>
Date: Sun, 31 Dec 1995 20:19:16 -0500
To: ss@tapr.org
Message-ID: <199601010119.UAA13699@polaris.mindport.net>
Rendered body type: text/plain

At 10:15 AM 12/31/95 -0600, you wrote:
>I've been collecting info on the various SS wireless LAN products,
>particularly those which can do >100 kbps. I'm capturing the data in a
>spreadsheet, and when I get a little further along, I'll HTML'ize it and
>make it available on the Web. I may be reinventing the wheel here, but
>so far I haven't come across any compilation of product info like
>this... if anyone knows of one, a pointer would be appreciated. The URL
>http://pasture.ecn.purdue.edu/~laird/Electronics/wireless-modems/ has a
>bit of relevant info, but it's very incomplete... I'm trying to do a
>much more comprehensive survey (and in '96, to get my hands on some of
>the hardware!).

Barry, the only other list that would come close is one I have written
listing other web sites of interest concerning SS products, including
commercial. See the URL

    http://www.tapr.org/ss/other.html

This page has proven to be very popular. It receives more hits that all the
rest of the SS pages I've written. If you would like Barry, you could link
your page from here.

Steve, N7HPR

(srbible@mindport.net, n7hpr@amsat.org, n7hpr@tapr.org)

11. Re: [SS:17] Re: SS Questions

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Sun, 31 Dec 1995 19:25:17 -0800
To: ss@tapr.org
Message-ID: <v02140a05ad0cfc6d88fa@[192.160.122.15]>
Rendered body type: text/plain

At 19:37 12/31/95, Steven R. Bible wrote:
>Barry, the only other list that would come close is one I have written
>listing other web sites of interest concerning SS products, including
>commercial. See the URL
>
>   http://www.tapr.org/ss/other.html
>
>This page has proven to be very popular. It receives more hits that all the
>rest of the SS pages I've written. If you would like Barry, you could link
>your page from here.

        I would try the following site, WIRELESS WORLD By Tim Cocklin:

                <http://www.iadfw.net/tcocklin/index.htm>

It has pointers to most commercial wireless product sites on the Web and
lots of other useful info. It really is a first class effort and where I
first go when I'm researching a wireless topic!!

-- Dewayne

Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! AOL: HENDRICKS
Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/

January 1996

Original source file: ss.9601
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9601

1. Re: [SS:18] Re: SS Questions

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Mon, 1 Jan 1996 13:39:40 -0500 (EST)
To: ss@tapr.org
Message-ID: <199601011839.NAA06672@hydra.carleton.ca>
Rendered body type: text/plain

```
>         I would try the following site, WIRELESS WORLD By Tim Cocklin:
>
>                 <http://www.iadfw.net/tcocklin/index.htm>
>
> It has pointers to most commercial wireless product sites on the Web and
> lots of other useful info.  It really is a first class effort and where I
> first go when I'm researching a wireless topic!!

Thanks - that one's a keeper!  I actually had Tim's wireless hardware
page buried amongst my bookmarks, but missed it when I took a quick look
before posting my message.

So, how many folks on the list actually have some experience with using
WLAN hardware?  Any stories to relate?

Barry

ps: some of you may have noticed that TAPR also has a WLAN mailing list.
It was a false start which has now been made redundant by this list, so
it should be disappearing...

--
  Barry McLarnon  VE3JF/VA3TCP   |  Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club      |  AMPRnet:  bm@lynx.ve3jf.ampr.org
  Packet Working Group           |  FreeNet:  aa187@freenet.carleton.ca
```

2. More SS Web Sites

From: rwhiting@winternet.com (Rick Whiting)
Date: Mon, 1 Jan 1996 17:03:48 -0600
To: ss@tapr.org
Message-ID: <199601012303.RAA00656@icicle>
Rendered body type: text/plain

```
Here are a couple of SS sites:

http://teleport.com/~nts is Northwest Technical Services which has info on a
number of commercial SS products.

http://olt.et.tudelft.nl/~glas/ssc/techn/techniques.html is a short tutorial
on spread spectrum (with illustrations).

73/Rick W0TN
  ------------------------------------------------------------------------
 | Richard A. (Rick) Whiting          Phone:  + 1 612 550 1213            |
 | 5780 Rosewood Ln. N.               E-mail: rwhiting@winternet.com      |
 | Plymouth, MN 55442-1411            Packet: W0TN @ WB0GDB.MN.USA.NOAM   |
 | U.S.A.                             Fax:    Number on request           |
  ------------------------------------------------------------------------
```

3. Re: [SS:19] Re: SS Questions

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Tue, 2 Jan 1996 10:16:28 -0800 (PST)
To: ss@tapr.org (Barry McLarnon VE3JF)
Message-ID: <199601021816.AA071026590@hpsadr2.sr.hp.com>
Rendered body type: text/plain

```
> So, how many folks on the list actually have some experience with using
> WLAN hardware?  Any stories to relate?
>
Barry
  We have a little experience here with Metricom Part 15 devices.  One
of the ports on redwood.ampr.org is connected by way of Metricom stuff
to the 44.4.44.x subnet here in northern CA.  Wb6eqo is the main user at
the northern end but has multiple hosts on it.

  I'm not sure of the total count of Metricom radios involved, to a
```

degree it is dynamic, but the radios are the newer 100 kbps (ricochet?) version and are all FH at 900 MHz. Since one of them is also at the site of redwood, there is a little QRM and the result is that redwood(which is not presentlly SS) loses about 2% of packets going through it. As long as there isn't a lot of loss elsewhere in a connection, this doesn't usually get noticed.

  Performance to wb6eqo isn't nearly so good as to other 230 kbps hosts. This is certainly no surprise. The hardware seems to work but isn't particularly more reliable than our amateur stuff. In fact, the recent rain, wind and lightning storm that took out so much still has the Part 15 devices to wb6eqo down completely. The 230 stuff is at least limping.

  During warmer weather, wb6eqo reported copying another Metricom radio from downtown silicon valley; about 80 miles to the south and definitely not LOS. This is an aberration though and normally only radios within 25-40 miles make it in I think.

  Throughput and latency are not as good as the 230 kbps hardware, and worse by much more than a factor of 2. I'm not sure of the causes, I believe that the Metricom's do FEC and have their own link protocol. In any case, ping results from santarosa.ampr.org to k6hsj.ampr.org over 230 kbps are under 40 mx rtt but more like 300 ms rtt to wb6eqo.

  Similarly, ftp throughput to k6hsj is on the order of 6 kbytes/sec but I don't think I see much more than 1/10th of that to wb6eqo. This is with no other users on the Part 15 network.

  It could be that some of this is due to too few Metricoms or other installation problems. I really don't know. These are just some observations.

  One thing I do like about the Metricoms is their remote diagnostic capabilities. They can report signal strength and I believe spectrem occupancy remotely.

  It is becoming obvious that remote network monitoring and control is going to be a big deal if amateur networks are ever going to get serious.

Glenn n6gn

4. WLAN stuff

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Sun, 7 Jan 1996 22:14:25 -0500 (EST)
To: ss@tapr.org
Message-ID: <199601080314.WAA24459@hydra.carleton.ca>
Rendered body type: text/plain

My first cut at compiling some info on wireless LAN modem products is available for your perusal at:

http://hydra.carleton.ca/info/wlan.html

This is a work in progress, so there's still lots of info missing. Comments, additional info, and constructive criticism welcome!

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | FreeNet: aa187@freenet.carleton.ca

5. American Microsystems ?

From: Greg Jones <wd5ivd@tapr.org>
Date: Sun, 7 Jan 1996 22:49:18 -0600 (CST)
To: ss@tapr.org
Message-ID: <199601080449.WAA28451@sys1.tapr.org>
Rendered body type: text/plain

Has anyone seen a S20043 from American Microsystems ? I saw an add of theirs in one of the trade journals. Seems they offer a SS component as low as $25 in qty . Maybe someone can call them and find out what they had -- it looked interesting. (208) 234-6711.

Greg

6. SS, Digital Comms, and DSP Books - a bibliography

From: srbible@mindport.net (Steven R. Bible)
Date: Thu, 11 Jan 1996 18:09:52 -0500
To: ss@tapr.org, hfsig@tapr.org
Message-ID: <199601112309.SAA16246@polaris.mindport.net>
Rendered body type: text/plain

Recently I was looking for textbooks on the topics of Spread Spectrum,
Digital Communications, and Digital Signal Processing. I turned to the
World Wide Web in search for these and technical book stores advertising on
the Web. Here's what I found.

    http://www.mindport.net/~srbible/biblio.html

The books listed on this page are recent, in-print books.

Hyperlinks on titles will take you to the publishers web page that will
describe the books in more detail. At the end of the book list are some book
stores that specialize in technical books and publishers.

Let me know how you like this format. Let me know if there's a book to add
to the list. Perhaps what would be even more useful to hams is a short
description by a ham on the fitness of the book toward our work. I would
like to rate the books either by stars (1 to 5 stars) or catogorize them as
theoretical, practical, recommended reading, mandatory read, a most have.

Other bibliograph web pages I have authored are:

  Spread Spectrum - http://www.tapr.org/ss/biblio.html

  Packet Radio - http://www.tapr.org/tapr/html/biblio.html

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

7. Pansat equipment

From: "Dave Holmes.................." <k4umi@widomaker.com>
Date: Sun, 14 Jan 1996 22:31:14 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BAE2D0.29F66B00@pm1-09.wmbg.widomaker.com>
Rendered body type: text/plain

Is there anyone out there that knows what equipment will be required to access the Pansat when it goes
up? I am very much interested in that mode and would like to build some hardware to get familiar with
spread spectrum.

8. Back issues

From: jeff@mich.com (Jeff King)
Date: Tue, 16 Jan 1996 23:19:53 -0500
To: ss@tapr.org
Message-ID: <199601170419.XAA23970@merit.edu>
Rendered body type: text/plain

Are there any back issues of this mailing list available?

Didn't see anything on the TAPR web site.

BTW, my link to the internet is via a 1.5 mile spread
spectrum link (full time) using FreeWave radios on
both ends.

Regards,

Jeff King
  "Real men do the internet via spread spectrum"

9. Re: Back issues

From: Lee Ziegenhals <n5lyt@tapr.org>
Date: Tue, 16 Jan 1996 22:52:41 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.PCW.3.91.960116224856.8886C-100000@harpo.n5lyt.datarace.com>
Rendered body type: text/plain

Back issues were supposed to be available but got left out because of a
technical problem; to wit: my brain wasn't working right when I set up the

list :-).

They'll be online in a few days, complete back to November.

Lee

> Are there any back issues of this mailing list available?
>
> Didn't see anything on the TAPR web site.
>
> BTW, my link to the internet is via a 1.5 mile spread
> spectrum link (full time) using FreeWave radios on
> both ends.
>
> Regards,
>
> Jeff King
>   "Real men do the internet via spread spectrum"

10. Re: [SS:26] Back issues

From: Greg Jones <wd5ivd@tapr.org>
Date: Wed, 17 Jan 1996 03:30:15 -0600 (CST)
To: ss@tapr.org
Message-ID: <199601170930.DAA10208@sys1.tapr.org>
Rendered body type: text/plain

The archives should be on-line shortly. Have been working on that and
several other issues in the past two weeks.

It will be in ftp.tapr.org/tapr/ss/mail_archive

Cheers - Greg

>
> Are there any back issues of this mailing list available?
>
> Didn't see anything on the TAPR web site.
>
> BTW, my link to the internet is via a 1.5 mile spread
> spectrum link (full time) using FreeWave radios on
> both ends.
>
> Regards,
>
> Jeff King
>   "Real men do the internet via spread spectrum"
>
>

11. New Mailing List Info - FYI

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Wed, 17 Jan 1996 08:40:14 -0800
To: ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140a06ad22d68546af@[204.118.182.22]>
Rendered body type: text/plain

From: "John A. Hansen" <hansen@ait.fredonia.edu>
Subject: List Opened for Those Interested in High Speed Spread Spectrum
Digital Communications
Content-Type: text/plain; charset=us-ascii
Sender: usenet@news.zippo.com
Content-Transfer-Encoding: 7bit
Nntp-Posting-Host: 141.238.20.175
Organization: SUNY-Fredonia
Message-ID: <30F9CE23.7F0A@ait.fredonia.edu>
X-Mailer: Mozilla 2.0b4 (Win95; I)
Mime-Version: 1.0
Date: Mon, 15 Jan 1996 03:46:43 GMT
Lines: 23

Hi,
A week or so ago I posted some preliminary results of experimental part 15
3 mbit/sec digital links that we have been playing with at SUNY-Fredonia.
Since then I've received quite a number of inquiries about the equipment
and its performance. Interestingly enough, most of the replies came from

folks who were not necessarily hams, but were interested in specific
commercial applications of this technology. In order to facilitate
communication between those who are interested in this stuff, I've

initiated a list on my own listserver. I will post the results of our experiments there and I hope that others will do the same. We are expecting this week to receive some higher gain antennas which should let us stretch the range a bit. If you are interested in participating (or eavesdropping) you may join this list by sending a message to:

listserv@ait.fredonia.edu

with a text (not subject, but text) of

join wireless

Thanks for the bandwidth.
--
John Hansen, WA0PTV
Director, Academic Information Technology
State University of New York - Fredonia
hansen@ait.fredonia.edu

12. My Experiences With Part 15 Spread Spectrum Equipment

From: "John A. Hansen" <hansen@ait.fredonia.edu>
Date: Wed, 17 Jan 1996 23:38:01 -0500
To: wireless@ait.fredonia.edu
Cc: ss@tapr.org, hansen@ait.fredonia.edu
Message-ID: <30FDCEA9.FE1@ait.fredonia.edu>
Rendered body type: text/plain

The Trip So Far in High Speed Digital Communication Via Spread Sprectrum

"Any sufficiently advanced technology is
indistinguishable from magic." - Clarke's Third Law.

I've been following developments in high speed data transmission via spread spectrum radio devices for a number of years. However, since I was intially interested in it as a hobbyist and since the prices were considerably more than my toy budget, about all I did was read and wonder. A couple of things happened in the last year to change this dramatically. First I became Director of Academic Information Technology at a local college, which put me in charge of bringing connectivity to campus. This also provided me with a significant budget allegedly for connectivity, but also, to more limited extent for research and development. Secondly, I attended this year's Networld+Interop in Atlanta. There I ran into a company called BreezeCom (formerly Lannair) which seemed to be selling 2.4 Ghz spread sprectrum devices that could push 3 mbits/sec over distances (they claimed) of over 3500 feet. They were actually demonstrating this equipment and it did appear to work.

There were a number of places on campus where I thought this technology had potential, though I wasn't exactly sure where it would go in first. So I figured the next step was to acquire some of it and cart around campus to see how it would perform over various paths.

The Breezecom product is not designed to be a bridge. A number of companies have products out like this. The theory is you put up an "access point" that is hooked directly into the ethernet network and then you buy a "station adapter" for each of the computers that you want to have access the system. A campus could have multiple access points and users could cruise between them, essentially the way cellular telephones do. What you are not supposed to be able to do with this type of technology is provide lan to lan links. A number of manufacturers I talked to, in fact, insisted it was impossible to hook a hub up to the station unit and have it work. This is a key point, because while I have some uses that will clearly involve the single unit access paradigm, I also have some pressing needs for point to point, lan to lan links. On our campus, this would often involve very low data rates. An example would be a group of 30 computers set up in one room to submit registration information for students. Very very little data is involved, but I would not want to buy a "station unit" for each of the 30 computers. The cheapest vendor of equipment that is designed as a "wireless bridge" that I could find would cost close to $5000 for one link. While this would be cheaper than buying a "station unit" for each of the computers, it still was more than I really wanted to pay.

I got to talking with the President of Breezecom about this and he said they were about to come out with firmware that would allow bridging, but that it wasn't available yet. He offered to let me beta test it. In the meantime, I asked if the bridging function was all that was required, wouldn't it be possible to use and outboard bridge or perhaps even a Windows NT box that had routing functions built in. He paused for a moment and allowed that it might work. That was enough for me to want to try it.

Access units from Breezecom come in two flavors but the price is the same in either case. The AP-10 is a unit with two integrated antennas in the transmitter that look a bit like rubber duck antennas. These are designed for distribution of ethernet within buildings. The second flavor is the AP-10D. It has no antennas, but comes with a pair of SMA connectors on it for installing external antennas. The company makes several external antennas. The simplest is a patch antenna in a plastic case somewhat larger than a pack of cigarettes. The company initially recommended hooking up two of these to the AP-10D. Only one of the two antennas is actually used at a time and the unit samples to see which provides the best connection. In practice, I have found virtually no difference in performance between using one and two antennas. Thus I would recommend using one. This is now the company's recommendation as well, unless you are in a place with lots of buildings and multipath problems. The patch antenna claims to have an h-plane beamwidth of 165 degrees and a gain of 8.5dBi. It is clearly directional, but I have means of verifying this claim. My experimentation leads me to think it may be somewhat narrower. The company also makes an omni antenna that has (if I remember correctly), a gain of about 6 dBi). If you are contemplating putting the antenna in a high location (We have a building in the center of campus that is 9 stories tall.. . the next tallest building is 3 stories), there is a potential problem with the omni because it does not radiate down (or up) well. The retail list price of the AP-10 or 10D is $1295, and the retail on the patch antenna and feedline (it comes with about 8 feet of cable) is $125. I asked about educational discounts (as I always do) and was told to check with their distributors. At that time, they had very few distributors and Breezecom agreed to sell to me for 10% off list. Since then, one of their distributors, GBC Technologies, has quoted me a price of just over $1000 for the access point and $78 for the patch antenna (though it is not clear whether that includes feedline).

The station units come in three flavors. First, there is a 1 port adapter (SA-10 and SA-10D, depending on whether it has integrated antennas or SMA connectors). This unit has one RJ-45 twisted pair connector. Second, there is a four port adapter (SA-40 and SA-40D) which has 4 RJ-45 twisted pair connectors. There is also a very interesting PCMCIA card for laptops. This is a really cute device that sticks out of a PCMCIA slot only about 1/2 inch and lets you cruise while being connected. The antenna is embedded in the card, and its range is rather limited (something like 300-400 feet) and its top data rate is 1 mbit/sec. Noneless, if one had an appropriate application it would be truly cool.

The list prices are 995, 695 and 395 respectively for these adapters. GBC has quoted me prices of something like $770 for the 4 port adater and $540 for the one port adapter. I didn't ask about the PCMCIA card, but since the rest of their prices seem to be about 25% off list, I would suspect that it will be in the range of $300. I bought a 4 port adapter directly from the company.

It took a long time (like 2 1/2 months) for me to actually get my hands on this equipment. Part of this is due to the fact that it is all imported from Israel (and this was about the time of the asassination there, though I have no idea whether this disrupted business enterprises or not) but part of it appears to be related to FCC approval. This is only my guesswork here based on indirect statements I've gotten from Breezecom and GBC. It appears, however, that the FCC isn't keen on the SMA connector approach. I have heard from a number of manufacturers that the FCC is requiring "proprietary" connectors on this type of unit so people won't buy them and hook up Big Kahuna antennas and violate the law. As I understand it (my reference here is Steve Bible's excellent article ... see www.tapr.org) you can run 4 watts erp from one of these stations without violating the law. Since the Breezecom unit has a power output of 50 milliwatts, you could legally get away with something around 19-20 dBi gain in the antenna system without violating the law. However, even a modest sized dish can generate more gain than this. Breezecom is trying a number of approachs to pacify the FCC... apparently one being to require a "professional" antenna installer, whatever that means. Anyway, right now it is possible to get "sample units" but larger quantities are unlikely to be available until this gets worked out with the feds.

My equipment showed up just after Christmas (how nice!). We got it up and running very quickly. There is a serial port on each of the units and you connect it to your PC running a terminal program to manage it. Start by putting an IP address in it, beyond that there is little to manage, at least initially. We first set up both units in the same room, but then moved them progressively further and further apart. Finally, we mounted the access point on the 9th floor of the tallest building on campus and taped the antennas to the inside of the window with McGuiver Tape. Further experimentation leads me to believe this system will perform better if we can

get the antenna outside (it is really designed to be mounted on the exterior of a building. We carted the station unit around campus with my laptop (which has an ethernet card in it) to test various paths. This was interesting because the unit runs off a 5 volt cube tap. If we had had a good sized 5 volt battery we could have literally gone anywhere and had a truly portable internet browser. Testing from several locations on campus led me to conclude that we simply would not be able to find a clear path on campus that was far enough to really tax the capabilities of the unit.

So the next step was to move off campus. Fortunately my house is located on a street that is adjacent to campus on the same side of the 9 story building that we put the antenna (gee, what a coincidence). It is close to a half mile away from the access point. We took the equipment to my kitchen and taped the antenna to my glass patio door. There are pine trees in my back yard that block the line of site path to the access point, but it worked anyway.

A note or two on signal strength and speed is probably in order. There are six lights on the station adapter. One is for power. One lights up when you have a link to an access point. One flickers as data moves over the link. The other three show you the speed at which data is moving. One of the nice things about Breezecom's units is that if the path is not good enough to support 3 mbit/sec it will ratchet down to 2 mbit/sec. If that's no good it will go to 1 mbit/sec and if that doesn't work it will fall back to .5 mbit/sec. If all three lights are lit you have 3 mbit/sec. Two lights and one light represent 2 and 1 mbit/sec respectively. If the link light is on and there is one signal strength light flashing, that means you are at .5 mbit/sec. With the setup described above, I get 1 light solidly on and a second one flashing. Breezecom advised me that if I went in through the serial link and locked the speed at 1 mbit/sec under these circumstances, throughput would actually go up, since it would no longer be switching back and forth between one and two mbit/sec. In fact when I did this throughput rose by about 20 percent. Over this path I can pass a 1 MByte file in under 9 seconds. When I take the antennas outside (just beyond the glass door) I get 2 lights. I took them to my attic, and after I peeled back the metal backing on the insulation, I got one light even though there was about 8 inches of snow on the roof. We've had some pretty serious snowstorms during this testing period (on occasion I can't even see the building that has the access point on it) and I've not seen any degredation in throughput as a result.

So we come to the bridging issue. I bought a small hub and hooked two computers to it and ran the uplink port to the transciever. It performed flawlessly even when I downloaded large files on both computers at the same time. Clearly the only barrier to lan to lan connections with this is that the unit will choke on too much data. I wouldn't want to try this on a lan with an application server running, certainly. BTW, the unit contains 8 megs of memory for buffering.

Frankly, the results astound me (hence the Clarke quote). I sit at home and treat my office machine hard drive as if it were just any other network asset. The campus link to the Internet is a T-1 connection (my first act as Director of Academic Information Technology was to upgrade this) and I cruise the net at a very respectable speed on this system from my home. When I used to dial up with a 28.8 modem and download a file, Netscape would report in the vicinity of 2.8 K/ sec. Now I see numbers like 35k/sec. The bottleneck is clearly no longer between me and campus. Are we having fun yet?

Well, 8.5 dBi gain on 50 milliwatts is considerably below the legal limit. So the next step was to look into higher gain antennas. I called Breezecom about it and they said they were coming out with a parabolic antenna shortly for just this purpose. One of their employees said they tested this successfully at a range of 20 miles. The president of the company later claimed 5-6 miles. They offer a 2 by 3 foot dish that has about 23 dBi gain for $395 list. They put 30 feet of RG-8 coax on it to bring the gain down to the legal limit.

However, I am aware of other sources of antennas. The company that was formerly DownEast Microwave sells loop yagis and claims they have actually sold some for precisely this purpose. They make a 1 foot yagi with 11 dB gain for about $50, a 3 foot yagi with 17 dB gain for $85 and a 6 foot loop yagi with 20 db gain (I don't have the price handy). These might be good choices for use with this system. However, I also knew that Bob Myers Communications was marketing an S band 2 by 3 foot parabolic antenna that sounds extremely similar to the Breezecom unit (except I believe Breezecom said their's was Magnesium). Advertised mostly as an Oscar 13 mode S downlinke antenna, Bob says the gain of his unit is 25 dB and the price is only about $75 including shipping ... so I ordered one. I also had to order some SMA to N adapters (does anyone know a cheap source for these??) I

expect this antenna to show up in the next day or two. At that point I'll push the envelope and see how far we can get. I think I will also probably order one of the loop yagi's as well and see what can be accomplished with higher gain antennas at both ends.

Since my initial posting on this subject many folks have asked where I got this stuff and how it performed. I'm hoping this posting will answer many of those questions. The phone numbers for the companies involved are:

BreezeCom (formerly Lannair)
2195 Faraday Ave Suite A
Carlsbad, CA 92008
619-431-9880 voice
619-431-2595 fax

If you like you may mention my name.

GBC Technologies
609-767-2500

I've been dealing with Scott Haines at this company. Be advised that while this firm clearly has better prices, they are just a reseller and they know virtually nothing about the products themselves. If you want an SA-10D be sure you are adament about it because their initial thought was that it was just a minor revision of the SA-10.

Please also understand that I am in no way affiliated with either of these companies and I don't know them well enough to personally vouch for their solvency or integrity. My initial impression is quite favorable, but please understand that it is my initial impression based on a relatively short relationship thus far.

All of this has led me to think considerably more broadly about the applications for this technology both as a pure part 15 device (I've contemplated selling really high speed internet access to local companies and individuals, for example) and as in the amatuer radio service. I'll address this in another posting.

--
John Hansen, WA0PTV
Director, Academic Information Technology
State University of New York - Fredonia
hansen@ait.fredonia.edu

13. Re: [SS:29] New Mailing List Info - FYI

From: jerryn@ici.net
Date: Thu, 18 Jan 1996 00:27:38 -0500 (EST)
To: ss@tapr.org
Message-ID: <ML-2.0.821942858.1541.root@innovative.tech.com>
Rendered body type: text/plain

How much are these radios? Do you support TCP/IP? DO you support X.25?
Is it spread spectrum? Can I put a 10 WATT am an YAGI antenea on it?
What's the range?

I built up some 19.2k spread spectrum modem that operate in the 902-925MHZ range. they kick out 10 watts each and with a YAGI I can get 15miles or so out of them with a YAGI.   I running them in X.25 mode.

I'm working on a modified version of X.25 that compresses the data packets. for it right now!

14. (no subject)

From: Doug Gibbs <dgibbs@ix.netcom.com>
Date: Thu, 18 Jan 1996 06:35:14 -0800
To: ss@tapr.org
Message-ID: <199601181435.GAA29560@ix13.ix.netcom.com>
Rendered body type: text/plain

join wireless

15. (no subject)

From: ve9dx@mi.net (ve9dx)
Date: Sun, 21 Jan 1996 16:16:01 -0400
To: ss@tapr.org
Message-ID: <199601212016.QAA28303@itchy.mi.net>

Rendered body type: text/plain

unaubacribe

Best regards... de Andy (VE9DX)

Ex: VE1ASJ, VE1DX, VE1SPI, VE8CW, VO2AB, CI8CW, CY0SPI, HP9FC, ZD9BP etc...

Paket: VE9DX@VE9BBS.#SNB.NB.CAN.NA

Internet: ve9dx@mi.net

Ph: 506-847-5656

16. (no subject)

From: srbible@mindport.net (Steven R. Bible)
Date: Tue, 23 Jan 1996 12:02:37 -0500
To: ss@tapr.org
Cc: wireless@ait.fredonia.edu
Message-ID: <199601231702.MAA25522@polaris.mindport.net>
Rendered body type: text/plain

Here are three messages from a thread I captured from the newsgroup comp.std.wireless. The discussion is DS vs FH spread spectrum. I thought that this group would be interested in reading this. Sorry, I missed the first part of the thread.

For those of you wondering, comp.std.wireless occasionally has discussions on SS topics. It's a good newsgroup to keep an ear on.

- Steve, N7HPR

---

cjm@world.std.com (Craig J Mathias) wrote:
>Jonathan sawyer (jfsawyer@freewave.com) wrote:
>: The FCC has allowed some adaptive hopping strategies for frequency
>: hoppers. There are limitations (i. e changes no faster than 30
>: seconds) but considerable improvement in avoiding interference can be
>: achieved.
>
>Part 15 rules do not allow adaptive or coordinated hopping. If constant
>noise exists in a portion of the band, the radio still has to hop into
>it and suffer the consequences. In addition, two radio subnets cannot
>coordinate their hopping patterns so as to avoid one another all the
>time. If such situations were allowed, frequency hopping would suddenly
>look a lot like continuous, high-amplitude, wideband noise, thereby
>causing interference to everyone else and not being a good "spectrum
>citizen". The objective of Part 15, after all, is *sharing*.

Sorry Craig but you are wrong. The FCC has allowed hopping patterns to change with the following conditions:

(1) The hopping pattern must still meet the rules for average occupancy, number and dwell time.

(2) Changing to a different hopping pattern is no more frequent than once every 30 seconds.

In the case of our radios, we start hopping a pattern which has much more than the minimum. As we see frequencies which are blocked, we delete those frequencies up to the point of having the minimum number. Meanwhile the blocked frequencies are monitored and are reused if they become unblocked. All this occurs no faster than once every 30 seconds.

We are a manufacturer of FHSS and as such are in constant communication with the FCC. In short we got it from the horse's mouth.

Synchronous hopping where multiple radios avoid each other has been

allowed on a rare occasion by the FCC. As an example, we have supplied thousands of radios to a medical information company which do hop synchronously to avoid each other. and is specifically allowed by the FCC. We were able to obtain a waiver by showing the resultant spectrum did not produce any more interference to others than an "Aloha" type of unsynchronized system. Furthermore, we have seen other companies obtain waivers as well with various restrictions.

Additionally having radios which synchronize their transmit times are allowed. Also radio systems are allowed which are synchronized and use different hopping as long as the level of self generated radio interference is no less than uncoordinated hopping.

>Note that DS does not have any such restrictions, since it's
>low-amplitude. DS can also use only portions of a band, thereby
>avoiding noisy areas.

Wrong again. A DS must by its very nature occupy a contiguous band i.e a DSSS occupying 910 to 914 MHz cannot split its signal to two bands of 908-911 and 913-914 to avoid a signal at 912 MHz. A Frequency hopper can do this. In fact we have supplied radios with such a split band to avoid colocated DSSS radios. A DSSS must contend with any interference which occurs within its band or it has to move.

When you have common situation where there are multiple interfering signals it is relatively improbable to find a contiguous segment in that band where there are no signals. Compare this to a FHSS which can use all the "nooks and crannies" in a band which do not contain interference. These "nooks and crannies" only has to be the size of the narrow instantaneous bandwidth of the FHSS.

>I don't understand this at all. In fact, I would argue that the
>essential redundancy is DS makes it much more reliable in typical
>situations. But, as I've noted in this thread before, I would not claim
>that one technique is essentially better than the other.

Craig, in a previous posting I have given a real and common scenerio in which our FHSS radio works reliably. I issued a challenge to anyone to show hows a reasonably priced DSSS radio could work at all in that scenerio. So far I haven't received any responses. For your edification, I suggest you evaluate that scenerio. I am sure you will come to the same conclusion as I.

Jonathan Sawyer

FreeWave Technologies

---

cjm@world.std.com (Craig J Mathias) wrote:

>If you are saying that you don't have to hop to a given frequency (i.e.,
>you can leave out noisy parts of the the band), that's news to me. I have
>heard of wavers being issued under rare cases, but my reading of Part 15
>does not include selective hopping. Granted, you can change the hopping
>pattern, but maximum dwell time is a requirement.

>Like I said, waivers have been issued. But this is not the general case.

>Again, if you're saying that you can hop around the noise without a waiver,
>that's news to me. This doesn't correspond to my reading of Part 15. But,
>I am prepared to stand corrected. Pls. cite specific wording in the Rules.

Part 15.247 of the FCC rules states that frequency hoppers operating in the 902 to 928 MHz band must:
(1) have at least hopping 50 frequencies separated by at least the RF bandwidth of the radio.
(2) average dwell time at each frequency should be equal and not exceed 0.4 seconds over a 20 second period.

Note that nothing is stated about whether those frequencies are contiguous, how they are derived and for that matter if synchronization with other radios can be done. The FCC under the "for the public good" statute has further imposed some restrictions in the general case of synchronization with other radios. There are no other restrictions set. Every manufacturer must, in their certification process describe

to the FCC the hopping algorithm used. The FCC can, for each
application, approve or deny this algorithm.

Seeking clarification regarding the changing of hopping patterns we
asked the FCC what general guidlines they use to allow selective
hopping. They gave us the restrictions which I mentioned in my
previous posting. Note that this applies to all manufacturers and not
just us so that a "waiver" is not required,

In the case of our radios we start with 112 hopping frequencies, much
more than the minimum 50. We can throw out as much as 62 frequencies
which are blocked, noisy, or what ever. Hopping on the remainder meets
all FCC guidelines. This changing of hopping patterns cannot occur
faster than the 30 second FCC limit.

>Multiple DS-based sub-bands could, in fact, be used by a single radio.

Doesn't this make the radio a hopper too ? I have already stated the
best radio may be a combo of both technologies.

>Also, multiple chipping codes could be used simultaneously in a single
>band. DS can therefore split the band in multiple ways if so desired.

Wrong as far at that interference I talked about is concerned.   Using
multiple chipping codes still does does not "split" the band around the
interference signal.

>I don't recall your specific scenario, but check out Dixon's book,
>_Spread-Spectrum Communications with Commercial Applications_, for a good
>discussion of this issue. I think you will find that no such bias, in the
>general case, exists in favor of FH. As I have said in this forum many
>times, both systems work. One is not universally "better" than the other.

About 9 years ago, after that text was published, I converted Dixon
over to the superiority of FHSS to plain old DSSS. This happened when
his company and mine independently developed an indoor communications
product for a client. Mine was FHSS, his was DSSS. Guess which one
didn't work when there was interference. He suggested a workaround is
to make his DSSS frequency agile at higher cost and complexity.
Needless to say, that client used our simpler and cheaper FHSS radio.
They still do. You will note Dixon's present proposed system for the
PCN band does use some hopping.

I will repeat the scenerio:

Two points, 10 miles apart, non line of sight, with a measured path
loss including antenna gain of 135 dB.   Present in the band are
multiple interfering (at least 20) signals averaging at least 20 dB
above the noise with varying modulations and bandwidths.   You must
spread or hop at least 6 MHz to overcome frequency selective fading of
the non line of sight path.   You must maintain an average of 38KB full
duplex communication with any down time unacceptable.

What I am describing is exactly what I see going from my house to the
office. In fact I am using this link right now as I type.   This path
and spectrum occupency is typical for any urban environment (and its
gonna get worse).

 A DSSS WILL NOT WORK IN THIS CASE, PERIOD.

Care to prove me wrong?

Jonathan Sawyer

FreeWave Technologies

>Like I said in my little piece at our website, I shall never get into a
>duel of "propagation" at forty paces. I guess I like to offer a more
>academic view point that a specific example does not prove a theory.
>
>Let me also offer a more generic counter example that does not go from
>someone's particular window to a particular office. Take Qualcomm's
>CDMA which is a bona fide DSSS, it allows at least 20 (I apologize if
>this is a low ball estimate. OK, no flames from Qualcomm) simultaneous
>non-line of sight links of 9.6 Kbps over a cell's diameter usually
>several miles. CDPD is also a bona fide adaptive frequency hopper
>system that carries 19.2 KHz airlink with 9.6 Kbps throughput. Do they

>work? you bet! HNS introduced a ETDMA which is a big time frequency
>hopper using a scheme similar to TASI, does it work? you bet!
>

Jonathan,

The question is what is the best technology to use in the Part 15
unlicensed bands where you do not have ANY control of the location,
type , or use of other devices in the same band. All of the above
systems do not pertain at all to this question. Coming from someone as
academically skilled as yourself, I find these statements particularly
disengenuous.

I would suppose that after spending thousands of dollars on a Solectek
wireless bridge for a 10 mile wireless link, I would not expect that
it would be shut down by somebody's cordless phone operating 500 feet
away. This has happened with DSSS radios.   Can it happen with
Solectek?   As a user, I would prefer a wireless system which has a
more graceful degradation with interference than one which dies
completely.

>There are 15.247 10 Mbps DSSS radios that are in the process of being
>productized by a number of companies, and I am not just about to ask
>FHSS to do the same....

Absolutely correct . The FCC has limited the bandwidth of FHSS so that
data rates above 2 Mbps become impracticable.   However there is no
free lunch here. Operating DSSS at such data rates imposes sever
penalties in range and the already limited interference protection.

>In this arena, there more newly minted PhDs than you can wave a stick
>at, and I have lost count of the journal articles since I left HNS.

Not me. I'm just a good'ol boy who barely got his BSEE but who has
spent the last 20 years playing with radio.

Jonathan Sawyer

FreeWave Technologies

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17. Further Experimentation with Part 15 SS

From: hansen@ait.fredonia.edu (John A. Hansen)
Date: Wed, 24 Jan 96 09:41:39 +0000 (EST)
To: wireless@ait.fredonia.edu
Cc: ss@tapr.org, w1xt@amsat.org
Message-ID: <199601241451.IAA20081@sys1.tapr.org>
Rendered body type: text/plain

Hi Folks,

   Here is some more information on our experiments with the BreezeCom
wireless equipment.

First the bad news. I talked to the folks at BreezeCom yesterday and they
have been unable to get the FCC to go along with their putting SMA
connectors on their equipment. As a result, they will be going to a
"proprietary" connector. The only way to get one of these connectors
legally will be to buy one of their antennas. As yet I have know
idea what the thing will look like. I presume that if one wanted to stay
with the rules of Part 15 one could not modify the unit to replace the
connector with something else
since it would violate type acceptance. If we ever start using this kind of
equipment on the amateur bands, that will be a different matter, of course.

As I mentioned sometime ago, I bought one of Bob Myer's S-band dishes to
test with this equipment. We took the dish to a hillside about 6 miles
outside of town (by car... a bit less as the crow files) to a place that
overlooks the Village of Fredonia. We were able to sustain a 1 megabit/sec
data link over the path from here to the college in the center of town.
Furthermore, conditions were less than optimal. The antenna for the access
point on our campus is still indoors and while it is pointed in the general
direction of the hillside we went to, we have not made any attempt to "aim"
it at the distant site. Furthermore, there are some trees (though not a
lot) in this path, including some evergreens. Finally, there was a light
rain the day we tried this (yeah, I know what you're thinking, why did he
try this in the rain?... the answer is the antenna and connectors had come
in and I was dying to see if it would work.). I was frankly surprised at

how well it worked.

Signal strength is extremely sensitive to the location of the antenna. We
received no signal at all while holding the antenna when we were standing on
the ground, but moving to the roof (only about 10-12 feet up) resulted in a
solid link.

The Myers antenna appears very well constructed and goes together quite
easily despite the fact that there are no instructions. Considering its low
price, it would seem to be a clear winner for applications like this. The
only problem is that something will have to be done to lower the gain
slightly in order to stay within the legal limit of Part 15. BreezeCom's
approach is to add 25 foot of RG-8, but I hate to loose this on receive as
well as transmit. As it turns out, our college just happens to have lying
around some smaller 2.4 ghz dishes. We expect to press those into service

for shorter range applications.

JAH

18. Re: [SS:35] Further Experimentation with Part 15 SS

From: ATVQ@aol.com
Date: Wed, 24 Jan 1996 11:32:46 -0500
To: ss@tapr.org
Message-ID: <960124113244_205546027@emout04.mail.aol.com>
Rendered body type: text/plain

can you send me info on breezecom and the equipment source for the SS units
you are using?
Also for TX loss and no RX loss, you can use a "preamp" relay but instead of
a preamp for RX its keyed in TX and there is a loss pad or coax etc to drop
the signal level on TX. 73 Henry KB9FO

19. Part 15 Rules Was: Further Experimentation with Part 15 SS

From: srbible@mindport.net (Steven R. Bible)
Date: Wed, 24 Jan 1996 16:13:30 -0500
To: ss@tapr.org
Message-ID: <199601242113.QAA28079@polaris.mindport.net>
Rendered body type: text/plain

Henry KB9FO said:

>Also for TX loss and no RX loss, you can use a "preamp" relay but instead of
>a preamp for RX its keyed in TX and there is a loss pad or coax etc to drop
>the signal level on TX.

For everyones information, here is the exact wording of 47 CFR Sec. 15.247,
aka Part 15 for spread spectrum. In it you will see the power restrictions
placed on Part 15 SS devices. It is very true that if you break type
acceptance that you no longer fall into these rules. Many hams then feel
that they enter Part 97 automatically. This is not the case! However, one
way to surpass Part 15 and enter Part 97 legally is to join the STA of
K6KGS. Also the ARRL filed in December a PRM to change the Amateur SS rules.

Here are some web sites that reference the above:

    Code of Federal Regulations - http://www.pls.com:8001/his/cfr.html
    K6KGS STA - http://www.tapr.org/ss/sta.html
    Part 97 Amateur SS Rules - http://www.tapr.org/ss/rules.html

- Steve, N7HPR

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47 CFR Sec. 15.247

Title 47
CHAPTER I
SUBCHAPTER A
PART 15
Subpart C

Sec. 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and
5725-5850 MHz.

(a) Operation under the provisions of this section is limited to frequency
hopping and direct sequence spread spectrum intentional radiators that
comply with the following provisions:

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i) Frequency hopping systems operating in the 902-928 MHz band shall use at least 50 hopping frequencies. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

(ii) Frequency hopping systems operating in the 2400-2483.5 MHz and 5725-5850 MHz bands shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

(2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

(b) The maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in Sec. 15.209(a), whichever results in the lesser attenuation. All other emissions outside these bands shall not exceed the general radiated emission limits specified in Sec. 15.209(a).

(d) For direct sequence systems, the transmitted power density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

(e) The processing gain of a direct sequence system shall be at least 10 dB. The processing gain shall be determined from the ratio in dB of the signal to noise ratio with the system spreading code turned off to the signal to noise ratio with the system spreading code turned on, as measured at the demodulated output of the receiver.

(f) Hybrid systems that employ a combination of both direct sequence and frequency hopping modulation techniques shall achieve a processing gain of at least 17 dB from the combined techniques. The frequency hopping operation of the hybrid system, with the direct sequence operation turned off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The direct sequence operation of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

Note: Spread spectrum systems are sharing these bands on a noninterference basis with systems supporting critical Government requirements that have been allocated the usage of these bands, secondary only to ISM equipment operated under the provisions of Part 18 of this chapter. Many of these Government systems are airborne radiolocation systems that emit a high EIRP which can cause interference to other users. Also, investigations of the effect of spread spectrum interference to U. S. Government operations in the 902-928 MHz band may require a future decrease in the power limits allowed for spread spectrum operation.

(54 FR 17714, Apr. 25, 1989, as amended at 55 FR 28762, Jul. 13, 1990)

20. Re: [SS:35] Further Experimentation with Part 15 SS

From: Joe Lanoue <k1vdz@usa.nai.net>
Date: Wed, 24 Jan 1996 17:50:19 -0500
To: ss@tapr.org
Message-ID: <199601242241.RAA12798@usa.nai.net>
Rendered body type: text/plain

At 09:06 AM 1/24/96 -0600, you wrote:
>Hi Folks,
>
>   Here is some more information on our experiments with the BreezeCom
>wireless equipment.
>
>First the bad news. I talked to the folks at BreezeCom yesterday and they
>have been unable to get the FCC to go along with their putting SMA
>connectors on their equipment. As a result, they will be going to a
>"proprietary" connector. The only way to get one of these connectors
>legally will be to buy one of their antennas. As yet I have know
>idea what the thing will look like. I presume that if one wanted to stay
>with the rules of Part 15 one could not modify the unit to replace the
>connector with something else
>since it would violate type acceptance. If we ever start using this kind of
>equipment on the amateur bands, that will be a different matter, of course.
>

If Breezecom is using what's known as a "Reverse Polarity SMA" our company sells Low Loss Coax (LMR-240) and Reverse Polarity SMA Plug connectors that fit the cable. Many Wireless Data (Part 15) people are using it since the cable loss is about half that of the RG58 commonly used on these systems. Let me know if you (or anyone else) would like information on the cable and connectors.

Best Regards....Joe @ Times Microwave Systems (203-949-8424)

21. JNOS with wireless LAN (fwd)

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Thu, 25 Jan 1996 03:59:09 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199601250359.DAA04109@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

I'm forwarding this posting from the nos-bbs mailing list, since most of you probably don't read it. There's some interesting info on this web site in Latvia... well worth a look.

-Barry

Forwarded message:
> From nos-bbs@hydra.carleton.ca Wed Jan 24 17:11:15 1996
> Date: Wed, 24 Jan 1996 11:55:13 -0500
> Message-Id: <Pine.SOL.3.91.960124184621.14071D-100000@toms>
> Reply-To: nos-bbs@hydra.carleton.ca
> Originator: nos-bbs@hydra.carleton.ca
> Sender: nos-bbs@hydra.carleton.ca
> Precedence: bulk
> From: Guntis Barzdins <guntis@mii.lu.lv>
> To: Multiple recipients of list <nos-bbs@hydra.carleton.ca>
> Subject: JNOS with wireless LAN
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: The KA9Q NOS-BBS Mailing List
> Content-Type: TEXT/PLAIN; charset=US-ASCII
> MIME-Version: 1.0
> In-Reply-To: <9601241604.AA12385@omega.nbed.nb.ca>
>
> Hi,
>
> I just finished a paper about using JNOS for Internet access over
> wireless LAN adapters (what we have been doing in Riga for 3 years now).
> It is primarilly intended for those not familiar with the technology, but
> might be of interest also to general JNOS community (running ax25 over
> wireless with double tunneling, etc.) The paper is available at URL:
>
> http://www.latnet.lv/LATNET/RADIOLink/
>
> Any comments bout the paper are welcome :-)
>
> Regards,
>
>   -- Guntis Barzdins
> ____
>   Institute of Math. and Comp.Sc.   Internet: guntis@mii.lu.lv
>   University of Latvia   phone: +371-2-212427
>   Rainis blvd. 29, Riga LV1459, Latvia   fax: +371-7-820153
>   mob.phone: +371-9-206943
>

>
>

--
Barry McLarnon VE3JF/VA3TCP
Ottawa Amateur Radio Club Packet Working Group
Email: bm@hydra.carleton.ca or bm@lynx.ve3jf.ampr.org

22. Re: [SS:38] Re: Further Experimentation with Part 15 SS

From: ATVQ@aol.com
Date: Thu, 25 Jan 1996 15:23:36 -0500
To: ss@tapr.org
Message-ID: <960125152333_127016632@emout05.mail.aol.com>
Rendered body type: text/plain

Joe at Times Microwave:

I have tried to buy some of the TMR 500, 600, 1200 etc, bu none of the distributers I contacted would give me any where near the price I see in Mobile Radio Technology write up last year. Local vendor Joseph and Gepco wanted about twice what Andrew 7/8" cost, so I had to buy Andrew HJ7-50 and connectors which is a lot harder to work with! Any suggestions on where I could get a couple of 140 foot pieces that wont blow my ham budget to smithereens?? 73 henry KB9FO, publiaher ATVQ Magazine.

23. Re: [SS:40] Re: Further Experimentation with Part 15 SS

From: arutz@adsnet.com (alan rutz)
Date: Thu, 25 Jan 1996 19:36:22 -0600
To: ss@tapr.org
Message-ID: <199601260136.TAA07660@alice.adsnet.com>
Rendered body type: text/plain

>I have tried to buy some of the TMR 500, 600, 1200 etc, bu none of the
>distributers I contacted would give me any where near the price I see in
>Mobile Radio Technology write up last year.

73 henry KB9FO, publiaher ATVQ Magazine.

Henry:
   If the "TMR" you ask about above is the same as "LMR" Times cable, I get it from TESSCO, at 1-800-472-7373, 24hrs/day/7days/wk....

In their catalog (the best in the two-way business, I think) they offer:

TIMES LMR-240 1/4" foam, good to 31 Ghz, loss at 450 = 5.28 db, $0.33/ft
TIMES LMR-500 1/2" foam, good to 12 Ghz, loss at 450 = 2.15 db, $0.70/ft
TIMES LMR-600 1/2" foam, good to 10 Ghz, loss at 450 = 1.72 db, $0.94/ft
TIMES LMR-900 5/8" foam, good to 7 Ghz, loss at 450 = 1.12 db, $2.64/ft
TIMES LMR-12007/8" foam, good to 5 Ghz, loss at 450 = .89 db, $3.46/ft
TIMES LMR-17001.25"foam, good to 3 Ghz, loss at 450 = .63 db, $5.60/ft

I think common "N" connectors (and even UHF connectors) work on selected cables of this family, such as the LMR-240 or the LMR-500......

With my tongue in my cheek, may I suggest that even folks who still work on the D.C. bands around 450 Mhz such as you do would like this performance?
Alan Rutz, Telecom Engineer
SHF Microwave Parts Co.
7102 W. 500 S.
La Porte, IN, 46350
arutz@shfmicro.com or arutz@adsnet.com

"Snailmail flyer available"

24. Re: [SS:41] Re: Further Experimentation with Part 15 SS

From: ATVQ@aol.com
Date: Thu, 25 Jan 1996 23:13:12 -0500
To: ss@tapr.org
Message-ID: <960125220303_406600010@emout05.mail.aol.com>
Rendered body type: text/plain

Thanks. By the way, I am on 900, 1296 and 2441 MHz. My biggest problem is not frequency, but power handling ability. I can now muster a full 1.5 KW+ CQ 100% on 6, 2, 440, (of course the DC bands 160-10) and soon 400 watts + on 900 and 1200 and 60 watts on 2441. all TPO. Plus quad or bigger arrays on each 2 and up. Can't hardly wait for spring to get the antennas on the tower top! The arrays are full az-el. Moon bounce here I come!

25. Re: [SS:35] Further Experimentation with Part 15 SS

```
From: jerryn@ici.net
Date: Fri, 26 Jan 1996 00:14:27 -0500 (EST)
To: ss@tapr.org
Message-ID: <ML-2.0.822633267.1541.root@innovative.tech.com>
Rendered body type: text/plain
```

How much $$$$$$$

26. ARLB007 FCC changes hearing date (fwd)

```
From: Greg Jones <wd5ivd@tapr.org>
Date: Fri, 26 Jan 1996 16:55:43 -0600 (CST)
To: ss@tapr.org, pcs@tapr.org (TAPR PCS Project)
Message-ID: <199601262255.QAA09593@sys1.tapr.org>
Rendered body type: text/plain
```

```
Forwarded message:
>From w1aw-daemon@arrl.org Fri Jan 26 16:53:37 1996
Subject: ARLB007 FCC changes hearing date
X-Mailing-List: w1aw-list
To: QST@tapr.org
From: w1aw@arrl.org
Organization: American Radio Relay League
Date: Fri, 26 Jan 1996 17:35:05 EST
Message-ID: <$arlb007.1996@arrl.org>


SB QST @ ARL $ARLB007
ARLB007 FCC changes hearing date

ZCZC AG86
QST de W1AW
ARRL Bulletin 7  ARLB007
>From ARRL Headquarters
Newington CT  January 26, 1996
To all radio amateurs

SB QST ARL ARLB007
ARLB007 FCC changes hearing date

The FCC has changed the date of its en banc hearing on spectrum
policy and management to March 5, 1996, and the ARRL hopes to
participate.  The original hearing date of January 31 had to be
rescheduled because of the Federal furloughs triggered by the
congressional budget deadlock and heavy snow which extended the
shutdown.

The FCC will hear oral presentations and ''allow a direct exchange of
viewpoints'' among individuals and representatives of affected
industries.  The commission will select panelists from among those
who have submitted letters of interest.  Panelists will address
future spectrum demand and user needs, trends in technology, and
approaches to spectrum allocation and assignment, including
licensing and uses.
NNNN
/EX
```

27. Re: [SS:39] JNOS with wireless LAN (fwd)

```
From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Sun, 28 Jan 1996 06:04:28 -0800
To: ss@tapr.org
Message-ID: <v02140b0ead3129a993a6@[192.160.122.15]>
Rendered body type: text/plain
```

```
Greg:

        The URL for this paper should be added to the TAPR SS page.

-- Dewayne


At 10:10 PM 1/24/96, Barry McLarnon VE3JF wrote:
>I'm forwarding this posting from the nos-bbs mailing list, since most of
>you probably don't read it.  There's some interesting info on this web
>site in Latvia... well worth a look.
>
>-Barry
>
[snip]
```

>> To: Multiple recipients of list <nos-bbs@hydra.carleton.ca>
>> Subject: JNOS with wireless LAN
>> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
>> X-Comment: The KA9Q NOS-BBS Mailing List
>> Content-Type: TEXT/PLAIN; charset=US-ASCII
>> MIME-Version: 1.0
>> In-Reply-To: <9601241604.AA12385@omega.nbed.nb.ca>
>>
>> Hi,
>>
>> I just finished a paper about using JNOS for Internet access over
>> wireless LAN adapters (what we have been doing in Riga for 3 years now).
>> It is primarilly intended for those not familiar with the technology, but
>> might be of interest also to general JNOS community (running ax25 over
>> wireless with double tunneling, etc.) The paper is available at URL:
>>
>> http://www.latnet.lv/LATNET/RADIOLink/
>>
>> Any comments bout the paper are welcome :-)
>>
>> Regards,
>>
>>   -- Guntis Barzdins
>> ____
>>   Institute of Math. and Comp.Sc.   Internet: guntis@mii.lu.lv
>>   University of Latvia   phone: +371-2-212427
>>   Rainis blvd. 29, Riga LV1459, Latvia   fax: +371-7-820153
>>   mob.phone: +371-9-206943
>>
>>
>>
>
>
>--
>Barry McLarnon VE3JF/VA3TCP
>Ottawa Amateur Radio Club Packet Working Group
>Email: bm@hydra.carleton.ca or bm@lynx.ve3jf.ampr.org

Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! AOL: HENDRICKS
Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
----

28. Re: [SS:45] Re: JNOS with wireless LAN (fwd)

From: srbible@mindport.net (Steven R. Bible)
Date: Sun, 28 Jan 1996 18:13:25 -0500
To: ss@tapr.org
Message-ID: <199601282313.SAA10703@polaris.mindport.net>
Rendered body type: text/plain

Working on it...

- Steve

>Greg:
>
>   The URL for this paper should be added to the TAPR SS page.
>
>-- Dewayne
>
>
>At 10:10 PM 1/24/96, Barry McLarnon VE3JF wrote:
>>I'm forwarding this posting from the nos-bbs mailing list, since most of
>>you probably don't read it. There's some interesting info on this web
>>site in Latvia... well worth a look.
>>
>>-Barry
>>
>[snip]
>
>>> To: Multiple recipients of list <nos-bbs@hydra.carleton.ca>
>>> Subject: JNOS with wireless LAN
>>> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
>>> X-Comment: The KA9Q NOS-BBS Mailing List

>>> Content-Type: TEXT/PLAIN; charset=US-ASCII
>>> MIME-Version: 1.0
>>> In-Reply-To: <9601241604.AA12385@omega.nbed.nb.ca>
>>>
>>> Hi,
>>>
>>> I just finished a paper about using JNOS for Internet access over
>>> wireless LAN adapters (what we have been doing in Riga for 3 years now).
>>> It is primarilly intended for those not familiar with the technology, but
>>> might be of interest also to general JNOS community (running ax25 over
>>> wireless with double tunneling, etc.) The paper is available at URL:
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>>> Any comments bout the paper are welcome :-)
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>>> Regards,
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>>>   University of Latvia   phone: +371-2-212427
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>>Barry McLarnon VE3JF/VA3TCP
>>Ottawa Amateur Radio Club Packet Working Group
>>Email: bm@hydra.carleton.ca or bm@lynx.ve3jf.ampr.org
>
>
>---
>Dewayne Hendricks, WA8DZP ! CIS: 75210,10   AppleLink: D6547
>Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
>43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
>Fremont, CA 94539-3204   ! AOL: HENDRICKS
>Fax: (510) 770-9854   ! WWW: http://www.warpspeed.com/
>---
>
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>

February 1996

Original source file: ss.9602
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9602

1. Is there anybody in there?

From: ssdc@lec-bbs.pu3akm.ampr.org
Date: Tue, 06 Feb 96 21:00:18 UTC
To: ss@tapr.org
Message-ID: <114085@LEC-bbs.ampr.org>
Rendered body type: text/plain

Hello,

I'm new to this list; just a couple of days today. Didn't get any
messages and was wandering if there's a FAQ or resource listing on
SS: chips, implementations, kits maybe...

Thank you very much in advance for your reply. I hope there's still
some discussions going on here.

Regards and 73++

Antonio

2. RE: 47] Is there anybody in there?

From: David Stirrup <DSTI@jna.com.au>
Date: Wed, 07 Feb 96 09:55:00 EST
To: ss <ss@tapr.org>
Message-ID: <3117E551@msg.jna.com.au>
Rendered body type: text/plain

Yeah,

I'm alive but like yourself have been wondering what is happening with
this area.

Very quiet which is suprising given the industry activity.

Dave Stirrup
VK2XDS

From: ss[SMTP:ss@tapr.org]
Sent: Tuesday, February 06, 1996 3:17
To: ss
Subject: [SS:47] Is there anybody in there?

Hello,

I'm new to this list; just a couple of days today. Didn't get any
messages and was wandering if there's a FAQ or resource listing on
SS: chips, implementations, kits maybe...

Thank you very much in advance for your reply. I hope there's still
some discussions going on here.

Regards and 73++

Antonio

3. Re: Is there anybody in there?

From: TSUJI@NSAEOC.EOC.NASDA.GO.JP
Date: Wed, 07 Feb 1996 09:52:14 +0900 (JST)
To: ss@tapr.org
Message-ID: <01I0XEKXF0II001GLU@NSAEOC.EOC.NASDA.GO.JP>
Rendered body type: text/plain

Hello, Antonio and others.

I'm alive, too. I joined this mailing list only a week ago.
Therefore, I don't know what happen here and keep watching now.
I'd like to participate it from the view point of satellite
communication.
Regards,

 Masanobu Tsuji

```
National Space Development Agency of Japan (NASDA)
e-mail: tsuji@rd.tksc.nasda.go.jp
-------------------------------------------------
```

4. new too but...

From: Gordon_Dey@software.mitel.com (Gordon Dey)
Date: Wed, 7 Feb 96 09:16:24 EST
To: ss@tapr.org
Message-ID: <9602071416.AA27340@Software.Mitel.COM>
Rendered body type: text/plain

I too am new...but given the requests for info, here is
a list of info sheets I have, to spur discussion:

Daico/GE/Marconi p35-4710 GaAs mmic for 2.4GHz wireless LAN
  (a neat-oh evaluation board exists: going to try and get it)
  (4712, 4713 variations exist)
   p35-4750 Tx/RxGain block and switch for 2.5GHz
   p35-4775 MMIC PA
Amtel 900MHz ss rf module (sorry, no number, it calls itself
   "advance information"

73, Gord.

5. Re: [SS-50] new too but...

From: "Bill Bard" <wtba@eci-esyst.com>
Date: 7 Feb 1996 10:30:15 -0500
To: ss@tapr.org
Message-ID: <n1388433299.37044@qmgate>
Rendered body type: text/plain

Thanks to all who provide info here. My interest is in any info/dev boards, etc where I can have a digital I/O bit stream (say 16kbps to 256kbps) and transmit and receive it with another board, perhaps at 900 MHz, low power.

Bill Bard
wtba@eci-esyst.com

6. Re: [SS:49] Re: Is there anybody in there?

From: ATVQ@aol.com
Date: Wed, 7 Feb 1996 11:20:37 -0500
To: ss@tapr.org
Message-ID: <960207112036_315180837@emout07.mail.aol.com>
Rendered body type: text/plain

hello all from chicago Henry KIB9FO ie here too.

7. RE: 52] Re: Is there anybody in there?

From: Willson Flor <willf@rrgroup.com>
Date: Wed, 7 Feb 1996 11:22:48 -0600
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <c=US%a=_%p=RRSystemsGroup%l=RRGROUP3960207112248CE004B00@rrgroup3.rrgroup.com>
Rendered body type: text/plain

You wrote:

From: ATVQ@aol.com[SMTP:ATVQ@aol.com]
Sent: Wednesday, February 07, 1996 10:23 AM
To: ss@tapr.org
Subject: [SS:52] Re: Is there anybody in there?

hello all from chicago Henry KIB9FO ie here too.

Hi, Henry. Will KB9JTT from Milwaukee is here as
well, both an avid SS enthusiast as well as an
ATVer (the ham radio kind, not the little vehicle
kind.) Is there any work being done on SS
video, Henry?

-Will Flor KB9JTT
Waukesha County, Milwaukee area, Wisconsin USA

8. Some info files

From: ssdc@lec-bbs.pu3akm.ampr.org
Date: Wed, 07 Feb 96 17:46:24 UTC
To: ss@tapr.org

Message-ID: <114132@LEC-bbs.ampr.org>
Rendered body type: text/plain

Hello,

thanks for all the replies. Here's a file that you may wish to read,
even though it may be outdated information. It deals with some devices
that conform to FCC part. 15.

Try archie HSEQUIP.ZIP; I think it can be found on tapr.org, but can't
remember where exactly.

Regards,

Antonio

9. SS RF links -Review article

From: taylord@ecn.purdue.edu (David G Taylor)
Date: Wed, 7 Feb 1996 13:00:20 -0500
To: ss@tapr.org
Message-ID: <ad3e955615021004a263@[128.46.169.162]>
Rendered body type: text/plain

Since there hasn't been much traffic....

The February '96 issue of "Personal Engineering", which covers various
aspects of personal computer use in engineering design, control, data
acquisition, etc., has a lengthy article on SS RF modems and network links.
Products from 20+ vendors are described, with specs and prices. Some of the
products use X.25 protocol.... Ranges go from 300 feet indoors to 40 miles
outdoors, most products in the ISM bands.

I know this is not the experimentation and development end of SS technology
hams might be interested in, but is does show a strong growth in commercial
products.

Does anyone have experience with these commercial units ?

--taylord@ecn.purdue.edu

10. RE: SS RF links -Review article

From: Willson Flor <willf@rrgroup.com>
Date: Wed, 7 Feb 1996 14:02:55 -0600
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <c=US%a=_%p=RRSystemsGroup%l=RRGROUP3960207140255CI004B00@rrgroup3.rrgroup.com>
Rendered body type: text/plain

You wrote:

From: taylord@ecn.purdue.edu[SMTP:taylord@ecn.purdue.edu]
Sent: Wednesday, February 07, 1996 12:06 PM
To: ss@tapr.org
Subject: [SS:55] SS RF links -Review article

·   Since there hasn't been much traffic....
·
·   The February '96 issue of "Personal Engineering", which covers various
·   aspects of personal computer use in engineering design, control, data
·   acquisition, etc., has a lengthy article on SS RF modems and network links.
·
·   Does anyone have experience with these commercial units ?
·

Sure. We use AT&T WaveLan 920 and the Persoft Wireless Bridges to
create a large WAN linking Ethernet LANs for the Experimental Aircraft
Associations's annual fly-in at Oshkosh, Wisconsin. We have to link the
main entrance booth, the campgrounds, the main HQ building, and
several other LANs or standalone computers, seperated by distances
up to 2 miles. These products work in the 900 MHz band, and the whole
system works like a charm. Stated throughput is 2 MBytes/sec, but
"extremely unscientific" timing tests show actual throughput in transferring
large files of about 60% that of a 10Base-T Ethernet connection operating
at a nominal 10 MBytes/sec.

We use an omnidirectional Persoft antenna at the main location (our main
location for this is the main entrance booth rather than the EA HQ building)
and Yagis at the other sites, since they really only have to communicate
with the main site. BTW, the software we're running over this system is

doing remote queries of a SQL database. A bit more information is contained
on our website, at "http://www.rrgroup.com/"

We've also set up multiple logical networks with AT&T WaveLAN, in the same
rooms but with different keys - there doesn't seem to be any noticeable drop
in throughput with two such networks, so the hybrid SS system they're using
seems to work very well.

-Will Flor
willf@rrgroup.com

P.S. to whoever on this list who's at teachnet.edb.utexas.edu, you
have a problem with your mailer daemon - please contact me
privately for more info.

11. Re: [SS:55] SS RF links -Review article

From: taylord@ecn.purdue.edu (David G Taylor)
Date: Wed, 7 Feb 1996 15:14:41 -0500
To: "Gwyn Reedy, W1BEL" <gwyn@paccomm.com>, ss@tapr.org
Message-ID: <ad3eb7211602100491f9@[128.46.169.162]>
Rendered body type: text/plain

>On Wed, 7 Feb 1996, David G Taylor wrote:
>
>> Since there hasn't been much traffic....
>>
>> The February '96 issue of "Personal Engineering", which covers various
>Would you provide an address or fax # or phone # so I can request a
>sample issue.
>
Should have done....
"Personal Engineering & Instrumentation News" is a qualified circ mag.
Circulation Hotline (603) 427-1427, or
pgsperseng@aol.com for the editorial office.
Paul G. Schreier, Editor, & login given above.

 KB9KNS

--taylord@ecn.purdue.edu

12. Re: [SS:54] Some info files

From: Greg Jones <wd5ivd@tapr.org>
Date: Wed, 7 Feb 1996 14:34:00 -0600 (CST)
To: ss@tapr.org
Message-ID: <199602072034.OAA21253@tapr.org>
Rendered body type: text/plain

Someone one might want to begin to collect the information gathered and we
can then make it availabein the SS ftp area on TAPR.ORZG

Cheers - Greg

>
> Hello,
>
> thanks for all the replies. Here's a file that you may wish to read,
> even though it may be outdated information. It deals with some devices
> that conform to FCC part. 15.
>
> Try archie HSEQUIP.ZIP; I think it can be found on tapr.org, but can't
> remember where exactly.
>
> Regards,
>
> Antonio
>
>

13. Re: [SS:47] Is there anybody in there?

From: "David Smith" <TECH@mis1.bay.k12.fl.us>
Date: Wed, 7 Feb 1996 14:30:01 +5
To: ss@tapr.org
Message-ID: <16C03601AF@mail.bay.k12.fl.us>
Rendered body type: text/plain

Hello world!!!

I too am wondering what this list is all about. Hope I have not made
a boo boo or missed something here. I want to find a way to link 33+
sites (schools) via some method other than dependance on MA Bell.
Data rates need to be HIGH (T1 to Ethernet) and costs must be LOW
(less than would cost for hardwire).

If this is NOT a potential place for this discussion, please accept
my appoligy in advance.

Thanks ... David ...AD4JT

> I'm new to this list; just a couple of days today. Didn't get any
> messages and was wandering if there's a FAQ or resource listing on
> SS: chips, implementations, kits maybe...
>

==
* G. David Smith   tech@mail.bay.k12.fl.us *
* Coordinator of Information Technologies   *
* Bay District Schools   *
* 1311 Balboa Avenue   *
* Panama City, Florida 32401   904.872.4226 *
==

14. difficulty with SS@TAPR.ORG

From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Wed, 7 Feb 1996 18:38:27 -0800 (PST)
To: ss@tapr.org
Cc: kc7ww@tapr.org
Message-ID: <Pine.OSF.3.91.960207182809.13730D-100000@biggulp.callamer.com>
Rendered body type: text/plain

It probably is my fault but I simply can not understand how to use the
TAPR ftp site!!! I bring this up as I have seen many indications of low
activity and it just might be others are having as difficult a time!

OK I understand that first must get to the TAPR site but then what in the
devil does it take to get to a newsgroup or SAG? The added forward slashes
lock up the system!! Normally one types DIR and uses some ordinary DOS
commands, but I have yet to get anything but a flashing cursor for this
effort. There is no way of breaking out of the error. I simply have to
hard reset the machine which makes the server terribly unhappy.

There is something terribly different about the TAPR system and I need
some instructions on the proper use. I feel left out and there is just
too many good things going on to allow this to continue!   Cliff W6HDO

15. Re: [SS:56] RE: SS RF links -Review article

From: Steve Pitchers <pitchers@prl.research.philips.com>
Date: Thu, 8 Feb 1996 09:45:52 GMT
To: ss@tapr.org
Message-ID: <12243.9602080945@lister.prl.research.philips.com>
Rendered body type: text/plain

This message is not in MIME format. Since your mail reader may or may
not understand this format, some or all of this message will probably
be legible. Contact your mail administrator for information about
upgrading your reader to a version that does not support MIME.

16. Re: [SS:53] RE: 52] Re: Is there anybody in there?

From: "LANIER.R.A-" <LANIER.R.A-_at_WESO.PO.023@smtpgty.bwi.wec.com>
Date: Thu, 08 Feb 96 08:39:49 EST
To: ss@tapr.org
Message-ID: <9601088237.AA823799222@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Hi Will,

     This is Tony (KE4ATO) from Orlando. I too am an SS
     enthusiast and am "working" on a QRPish DSSS (FHSS?)
     xcvr. I have been corresponding with a gentleman in
     Norway who wants to do the same thing. One of our
     long-term goals is to have a trans-Atlantic QSO with
     SS.

     SS is definitely the wave of the future, as some have
     pointed out. Right now I working towards a Masters in EE
     and it is my intention to do my thesis on SS. But what
     the subject will be, I'm not sure.

All for now,

Tony Lanier

_____ Reply Separator _____

You wrote:

From: ATVQ@aol.com[SMTP:ATVQ@aol.com]
Sent: Wednesday, February 07, 1996 10:23 AM
To: ss@tapr.org
Subject: [SS:52] Re: Is there anybody in there?

hello all from chicago Henry KIB9FO ie here too.

Hi, Henry. Will KB9JTT from Milwaukee is here as
well, both an avid SS enthusiast as well as an
ATVer (the ham radio kind, not the little vehicle
kind.) Is there any work being done on SS
video, Henry?

-Will Flor KB9JTT
Waukesha County, Milwaukee area, Wisconsin USA

17. Help!

From: "Richard Zimmerman" <goose@atlantic.net>
Date: Thu, 8 Feb 1996 09:32:29 -0500
To: ss@tapr.org
Message-ID: <199602081436.JAA02668@rio.atlantic.net>
Rendered body type: text/plain

Would someone be kind enough to tell me HOW to unsubscribe from
this list.... My ISP changed names, but mirrred the old addresses and
can not get the list sever to disconnect me.

my OLD address was: goose@ocala.com

Any help is appriciated.

* + * + * + * Railfanning is my past time * + * + * + *
(Train Watching)

Goose HAM Radio!

Richard Zimmerman Callsign: KE4RIT
goose@atlantic.net QTH: Ocala, FL. USA

18. Re: [SS:53] RE: 52] Re: Is there anybody in there?

From: ATVQ@aol.com
Date: Thu, 8 Feb 1996 11:14:05 -0500
To: ss@tapr.org
Message-ID: <960208111404_316211909@mail04.mail.aol.com>
Rendered body type: text/plain

not that I have heard of. I don't think the SS crowd has gotten to visual
images yet. But it is worth looking into. It would be a way of keeping
video on all of the 440 band since SS and FM are compatible. Letme know or
find out if anyone is working video on SS so we can get the info and ge tthe
word out. 73 Henry

19. Re: [SS:61] RE: SS RF links -Review article

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Thu, 8 Feb 1996 10:32:50 -0600 (CST)
To: ss@tapr.org
Message-ID: <199602081632.KAA21372@solar.cs.tamu.edu>
Rendered body type: text/plain

Since I've had problems here making MetaMail work on our Sparcs, I think I'll
continue to use elm as my mail reader, and merely shun the MIME-encoded stuff.

I'll point out that really this is a backlash to Micro$loth's determination
that after last June, *everyone* in the universe was actually using Win98 on
all platforms, including those never compiled for, and that since the M$ mail
program was superior to everything else, including those that happened to
COMPLY with the RFCs on mail, everyone could read MIME-encoded messages and

nothing else save the headers need ever be sent in plain-text again!

Or do I miss something?:-)

73, gerry
--
Gerry Creager N5JXS   * SAREX Co-Investigator
gerry@cs.tamu.edu   *   A little radio that lets kids talk
                                     *   to astronauts, and smile
****

20. Re: [SS:59] Re: Is there anybody in there?

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Thu, 8 Feb 1996 15:31:10 -0500 (EST)
To: ss@tapr.org
Message-ID: <199602082031.PAA29822@hydra.carleton.ca>
Rendered body type: text/plain

Hmmm, signs of life. :-) There's quite a few people out there, actually -
more than 200 at last count. But most are quietly lurking, waiting for
something to happen. :-)

This list has only been around for a couple of months, and has not
generated lots of traffic, but I think it's just a matter of time.
There have been several good postings with pointers to sources of
information, and some very interesting accounts from some folks who
are using commercial SS WLAN hardware. For the latecomers, you can
peruse last month's archived postings by sending this request in the
body of a message to listserv@tapr.org:

get ss jan.96

As for discussion topics, someone just said that "SS is compatible with
FM" (or words to that effect), and inferred that most or all of the 70cm
band could be used for SS. Anyone care to take that one on? :-) Seriously,
interference is an important topic for SS, since no matter where we try
to use it, we're going to be sharing the spectrum with other services.
Does that mean we should favor FH over DS? Discuss amongst yourselves...

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | FreeNet: aa187@freenet.carleton.ca

21. Re: Is there anybody in there?

From: jra1854@tntech.edu (Jeffrey Austen)
Date: Thu, 08 Feb 1996 15:36:32 -0600
To: ss@tapr.org
Message-ID: <v01530501ad40195873e7@[149.149.42.11]>
Rendered body type: text/plain

>I don't think the SS crowd has gotten to visual
>images yet. But it is worth looking into. It would be a way of keeping
>video on all of the 440 band since SS and FM are compatible.

I doubt that you'll see SS ATV on the 440 band because there's just not
enough bandwidth available. Spread spectrum works by spreading the
bandwidth of a signal out over a much wider frequency range than it
normally would occupy. For example, if an ATV signal has a bandwidth of 4
MHz and a spreading factor of 10 (10 dB processing gain) is used, which is
relatively small, the resulting bandwidth is over 40 MHz (for QPSK; it's
over 80 MHz if BPSK is used).

The same problem exists for high-speed packet. High data rates multiplied
by large spreading factors result is very large bandwidths. We've gotta go
to the microwave bands to make it work within our frequency allocations.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505   U.S.A.

22. Re: Pansat equipment

From: jra1854@tntech.edu (Jeffrey Austen)
Date: Thu, 08 Feb 1996 15:36:35 -0600
To: ss@tapr.org
Message-ID: <v01530502ad401bcb0721@[149.149.42.11]>
Rendered body type: text/plain

>Is there anyone out there that knows what equipment will be required to
>access the Pansat when it goes up? I am very much interested in that mode
>and would like to build some hardware to get familiar with spread spectrum.

There is some PANSAT information on the World-Wide Web. It can be found at
http://www.sp.nps.navy.mil/pansat/pansat.html

Some students in a communications course here at TTU are building a
demodulator for PANSAT. When the project is completed, in late April, I'll
post some information about it to this list.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505   U.S.A.

23. Re: difficulty with SS@TAPR.ORG

From: Lee Ziegenhals <n5lyt@tapr.org>
Date: Thu, 8 Feb 1996 16:09:10 -0600 (CST)
To: ss@tapr.org
Cc: Clifford Buttschardt <cbuttsch@slonet.org>
Message-ID: <Pine.PCW.3.91.960208160011.17638I-100000@gristle.datarace.com>
Rendered body type: text/plain

Cliff,

I haven't noticed any such problems myself, so it may be an incompatibility
between our server and your client. If you will send me a note with the
following info, I'll take a look at it and see what I can do:

- Type of client you were using (e.g., Unix FTP client, WS_FTP for
  Windows, Netscape, etc.)

- Date and time you tried to connect

- Host name or IP address from which you connected

- The commands you issued

Note that some older clients have trouble with some of the multiline
responses that WUFTPD use. You might try putting a "-" as the first
character of the password (i.e., your email address) to turn this off. If
anyone has trouble logging into the FTP server, try this first!

Thanks,
Lee Ziegenhals (n5lyt@tapr.org)

> It probably is my fault but I simply can not understand how to use the
> TAPR ftp site!!! I bring this up as I have seen many indications of low
> activity and it just might be others are having as difficult a time!
>
> OK I understand that first must get to the TAPR site but then what in the
> devil does it take to get to a newsgroup or SAG? The added forward slashes
> lock up the system!! Normally one types DIR and uses some ordinary DOS
> commands, but I have yet to get anything but a flashing cursor for this
> effort. There is no way of breaking out of the error. I simply have to
> hard reset the machine which makes the server terribly unhappy.
>
> There is something terribly different about the TAPR system and I need
> some instructions on the proper use. I feel left out and there is just
> too many good things going on to allow this to continue!   Cliff W6HDO

24. Books on Spread Spectrum

From: srbible@mindport.net (Steven R. Bible)
Date: Thu, 8 Feb 1996 20:13:04 -0500
To: ss@tapr.org
Message-ID: <199602090113.UAA01396@polaris.mindport.net>
Rendered body type: text/plain

I spent some time surfing the web for books. I created a temporary
bibliography of books on Spread Spectrum, DSP, Digital Communications, and
MATLAB. You can take a look at:

http://www.mindport.net/~srbible/biblio.html

I will be moving this page to the www.tapr.org site soon. In the mean time, please take a look and give comments. You can see the books that I have found in the above catagories. You can click on the titles and you will go to the publishers web pages that describes the books in detail. I have also included some technical bookstores at the bottom of the page. I have had excellent results with the San Diego Technical Bookstore (no peculinary interest, just a happy customer).

73,

- Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

25. Re: [SS:67] Re: Is there anybody in there?

From: ATVQ@aol.com
Date: Fri, 9 Feb 1996 11:42:04 -0500
To: ss@tapr.org
Message-ID: <960209114203_418526920@emout07.mail.aol.com>
Rendered body type: text/plain

yes, not likely on 420-450, perhaps on 1240-1305??

26. Another SS Web Site

From: Thomas M Allen <thos@deltanet.com>
Date: Fri, 09 Feb 1996 09:29:25 -0800
To: ss@tapr.org
Message-ID: <1.5.4b11.16.19960209172925.0877a8c8@mail.deltanet.com>
Rendered body type: text/plain

I don't know if this site has been mentioned or not, but has some useful and interesting information:

http://www.sp.nps.navy.mil:80/ss/

WA6IGY

Thomas M. Allen | Brea, California USA

27. Re: [SS:72] Another SS Web Site

From: srbible@mindport.net (Steven R. Bible)
Date: Fri, 9 Feb 1996 17:20:11 -0500
To: ss@tapr.org
Message-ID: <199602092220.RAA24314@polaris.mindport.net>
Rendered body type: text/plain

>I don't know if this site has been mentioned or not, but has some useful and
>interesting information:
>
> http://www.sp.nps.navy.mil:80/ss/
>

Tom, I wrote those pages and have since moved them to www.tapr.org/ss. The tapr pages are a mirror of the same pages and they are enhanced. I need to remove the stuff at NPS and put in pointers to TAPR.

Hope this doesn't confuse to many people. The TAPR pages are the most upto date.

- Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

28. Re: [SS:72] Another SS Web Site

From: Greg Jones <wd5ivd@tapr.org>
Date: Fri, 9 Feb 1996 17:59:21 -0600 (CST)
To: ss@tapr.org
Message-ID: <199602092359.RAA01655@tapr.org>

Rendered body type: text/plain

That site is now located at www.tapr.org/ss we moved it over when Stevce
Bible left the NPGS.

Thge latest and greatest is here....:-)

Cheers - Greg

>
> I don't know if this site has been mentioned or not, but has some useful and
> interesting information:
>
>   http://www.sp.nps.navy.mil:80/ss/
>
> WA6IGY
>
> -------------------------------------
> Thomas M. Allen | Brea, California USA
>
>

29. ARRL PRM Filing December 12th

From: Greg Jones <wd5ivd@tapr.org>
Date: Sat, 10 Feb 1996 17:31:59 -0600 (CST)
To: ss@tapr.org
Message-ID: <199602102332.RAA24077@tapr.org>
Rendered body type: text/plain

For those who have not read the ARRL filing on SS rule changes. Check out
the TAPR SS Page. www.tapr.org/ss

Cheers - Greg

30. Re: [SS:67] Re: Is there anybody in there?

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Sun, 11 Feb 1996 22:21:04 -0500 (EST)
To: ss@tapr.org
Message-ID: <199602120321.WAA03909@hydra.carleton.ca>
Rendered body type: text/plain

> >I don't think the SS crowd has gotten to visual
> >images yet. But it is worth looking into. It would be a way of keeping
> >video on all of the 440 band since SS and FM are compatible.
>
> I doubt that you'll see SS ATV on the 440 band because there's just not
> enough bandwidth available. Spread spectrum works by spreading the
> bandwidth of a signal out over a much wider frequency range than it
> normally would occupy. For example, if an ATV signal has a bandwidth of 4
> MHz and a spreading factor of 10 (10 dB processing gain) is used, which is
> relatively small, the resulting bandwidth is over 40 MHz (for QPSK; it's
> over 80 MHz if BPSK is used).

True for existing ATV, but suppose, for the sake of argument, that an
intrepid ATVer decided to dump NTSC and instead use highly-compressed
digital video at say 64 or 128 kbps... if it can be done using ISDN, why not
packet? At that rate, you could get a decent amount of processing gain
even if you confined it to a 6 MHz segment like ATV uses now. And think
of the advantages: interference resistance (NTSC has zilch), the possibility
of having multiple simultaneous users, internetworking via the Internet or
other wireline means, multiplexing with other data, etc. This would be far
better use of a prime piece of spectrum than NTSC, n'est-ce pas?

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | FreeNet: aa187@freenet.carleton.ca

31. New WLAN Article

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Sun, 11 Feb 1996 22:37:24 -0500 (EST)
To: ss@tapr.org
Message-ID: <199602120337.WAA04118@hydra.carleton.ca>
Rendered body type: text/plain

The latest PC Magazine (Feb 20) has an interesting article with test
reports on nine WLAN products. WaveLAN had the highest throughput,

but they gave the Editor's Choice to Proxim RangeLAN2, which was the
best performer amongst the FH products and had good range and good
setup/management utilities.

BTW, I've done some updating of my survey of WLAN modem hardware...
check out http://hydra.carleton.ca/info/wlan.html (if you're using
a text-based browser, don't bother - it'll be a mess!). As always,
comments welcome...

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | FreeNet: aa187@freenet.carleton.ca

32. Digital SS Video

From: Will Flor <willf@rrgroup.com>
Date: Sun, 11 Feb 96 22:20:43 -0600
To: ss@tapr.org
Message-ID: <9602120421.AA22908@inc.net>
Rendered body type: text/plain

You wrote:

From: Barry McLarnon VE3JF[SMTP:bm@hydra.carleton.ca]
Sent: Sunday, February 11, 1996 9:30 PM
To: ss@tapr.org
Subject: [SS:76] Re: Is there anybody in there?

>suppose, for the sake of argument, that an
>intrepid ATVer decided to dump NTSC and instead use highly-compressed
>digital video at say 64 or 128 kbps... if it can be done using ISDN, why not
>packet? At that rate, you could get a decent amount of processing gain
>even if you confined it to a 6 MHz segment like ATV uses now. And think
>of the advantages: interference resistance (NTSC has zilch), the possibility
>of having multiple simultaneous users, internetworking via the Internet or
>other wireline means, multiplexing with other data, etc. This would be far
>better use of a prime piece of spectrum than NTSC, n'est-ce pas?

Yes, I think digital SS video is the way to go. MPEG takes about 1.5 MBits/sec AFAIK
for "VHS-quality" video. Does anybody know of any relatively cheap ways to compress
video to lower bit rates? You mentioned ISDN - I'm not aware of 64 kbps video over
ISDN products, but if any exist, they would be worth looking into. Obviously, once
it's digital, making it SS would be relatively easy. Does anybody have any info
on existing products that could be used for this? My ultimate goal, of course, is
digital SS video at the same screen size & resolution as analog ATV.

73 de Will KB9JTT

33. Re: [SS:78] Digital SS Video

From: ATVQ@aol.com
Date: Mon, 12 Feb 1996 00:50:21 -0500
To: ss@tapr.org
Message-ID: <960212005020_219890396@emout09.mail.aol.com>
Rendered body type: text/plain

THE LOWEST MPEG rate know of that will give full motion video & color is
about 1.2 mbyte/sec. In digital video storage the bcst boys use 9 gigbytes
of hard drive to store 70 minutes. that is using a "secret" bit reduction
scheme and mpeg. You can get twice that by dropping one field, below that
the video gets rather ratty, more like 6 hr vhs copied to 6 hr vhs. The
"grand alliance" uses mpeg plus 16, 32 or 64 carriers to make a
"constellation" of phase/amplitude modulated signals in VSB format to fit
5.5 MHz of data into 6 MHz of spectrum (go figure, since the full NTSC
signal fits there just fine!) That is with multi frame look-ahead/behind fill
and vector descriptions rather than actual bit stream.
Ma Bell says they can get it down a twisted pair up to 2 miles, but they are
using highly EQ'd line and a very low bit rate on multiple carriers and the
video is real crap "VHS quality" more like 6th generation VHS from what I
have seen so far. But Ma bell is going fiber as fas as she can to add not
only video but other services direct to door. I have yet to see any digital
system that takes less room than an analog where both offer the same quality
video. But hey, microsoft will join with IBM and Intel and do it sooner or
later.... for more $$ than I have!.   73 Henry KB9FO

34. Re: [SS:77] New WLAN Article

From: srbible@mindport.net (Steven R. Bible)
Date: Mon, 12 Feb 1996 07:47:52 -0500
To: ss@tapr.org
Message-ID: <199602121247.HAA03387@polaris.mindport.net>
Rendered body type: text/plain

>The latest PC Magazine (Feb 20) has an interesting article with test
>reports on nine WLAN products. WaveLAN had the highest throughput,
>but they gave the Editor's Choice to Proxim RangeLAN2, which was the
>best performer amongst the FH products and had good range and good
>setup/management utilities.
>
>BTW, I've done some updating of my survey of WLAN modem hardware...
>check out http://hydra.carleton.ca/info/wlan.html (if you're using
>a text-based browser, don't bother - it'll be a mess!). As always,
>comments welcome...

Yes, I just read this review this weekend. The items they tested were only PC Card (aka PCMCIA) capable adapters along with their respective access points. The review has a good overview of wireless (now sometimes called Cordless) LAN technology. However, PC Magazine does not have a clue as what spread spectrum is :-).

I think the next thing you can take away from this reveiw is the cost of the adapters and access points. Prices are coming down, however, they are not amateur prices yet. Plus the software supplied with the units supports various LAN protocols. Ofcourse this is not a problem if one keeps the units in Part 15 or lives in a land that does not require AX.25.

I also typed in the products and manufactures into a web page and included their home web page if they had one. These are the products reviewed in the PC Magazine article. You can take a look (temporary) at:

    http://www.mindport.net/~srbible/wireless.html

Perhaps Barry you can find something of use for your page.

73,

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

35. Re: [HFSIG:872] Re: SLOW BPSK NEWS

From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Mon, 12 Feb 1996 10:35:56 -0800 (PST)
To: Johan Forrer <FORRERJ@frl.orst.edu>
Cc: hfsig@tapr.org, ss@tapr.org
Message-ID: <Pine.OSF.3.91.960212102003.1931D-100000@biggulp.callamer.com>
Rendered body type: text/plain

Hi Johan. Many thanks for your encouragement regarding the slow speed BPSK that we both are doing. I was most interested to see where your are using 30 bps ASCII! Since I had no clue, it is refreshing to know this. We are using ten bps ASCII also with seven data bits and two stop bits. This produces one character persecond. The software is entirely done, and in fact improved daily. We started out with 12 samples per bit and now are up to 20----the maximum that a 486 computer can analyze real time. The system is about to be changed to what is called PSKL which stands for Phase Shift Keying Lattice code. Where the 7 bit code and a two to the seventh or 128 possible pattern, PSKL proposes to transmit a 16 bit frame for each character instead of ten. Here is where things differ from anything normal. 128 characters have to be selected. Finally Bill DeCarle came up with 128 codewords that differ from each other by at least six bit positions!! After all this is done then the computer selects the one character that has the smallest number of altered bits.
     Now before I scare everyone off with all this, realize that the work done so far is ORDINARY ASCII----just as you are using. The PSKL is simply something we are doing for future evaluation.
     Maybe now it becomes more apparent why I have no patience fooling around with a silly bulletin board system that will not work for me!!
Cliff Buttschardt   W6HDO

36. Free RFICs!

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Tue, 13 Feb 1996 20:36:40 -0500 (EST)
To: ss@tapr.org
Message-ID: <199602140136.UAA12600@hydra.carleton.ca>
Rendered body type: text/plain

Motorola has RFIC chipsets (LNA/mixers, upmixers, exciters, PAs, switches,
modulators) for 900 MHz, 1.8 GHz and 2.4 GHz, and they're advertising
freebie sample kits of same. The ad doesn't say which parts are included
in the kits, but this looks like a real deal for you intrepid RF
experimenters out there... the part nos. for the kits of interest are:

900 MHz: CSPDMRFIC9PAK/D
2.4 GHz: CSPDMRFIC24PAK/D

Number to call is 1-800-441-2447.

Saw this in "Microwave Product Digest", Jan 96.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | FreeNet: aa187@freenet.carleton.ca

37. Re: [SS:82] Free RFICs!

From: srbible@mindport.net (Steven R. Bible)
Date: Tue, 13 Feb 1996 22:03:05 -0500
To: ss@tapr.org
Message-ID: <199602140303.WAA15509@polaris.mindport.net>
Rendered body type: text/plain

>Motorola has RFIC chipsets (LNA/mixers, upmixers, exciters, PAs, switches,
>modulators) for 900 MHz, 1.8 GHz and 2.4 GHz, and they're advertising
>freebie sample kits of same. The ad doesn't say which parts are included
>in the kits, but this looks like a real deal for you intrepid RF
>experimenters out there... the part nos. for the kits of interest are:
>
>900 MHz: CSPDMRFIC9PAK/D
>2.4 GHz: CSPDMRFIC24PAK/D
>
>Number to call is 1-800-441-2447.
>
>Saw this in "Microwave Product Digest", Jan 96.

Looks like this is the web page that describes the items in the package.
However, I could not download the data sheets; I received an error instead.

   http://design-net.com/rf/monoic.html

73,

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

38. Review of a posted site

From: Greg Jones <wd5ivd@tapr.org>
Date: Sun, 18 Feb 1996 19:10:14 -0600 (CST)
To: ss@tapr.org
Message-ID: <199602190110.TAA04399@tapr.org>
Rendered body type: text/plain

Someone posted

http://olt.et.tudelft.nl/~glas/ssc/techn/techniques.html

a few weeks ago. I just added it to the SS web page -- this is a really
good intro page on SS.

If you didn't look at it -- you should.

Greg

39. Re: [SS:68] Re: Pansat equipment

From: "LANIER.R.A-" <LANIER.R.A-_at_WESO.PO.023@smtpgty.bwi.wec.com>
Date: Tue, 20 Feb 96 08:46:47 EST
To: ss@tapr.org
Message-ID: <9601208248.AA824836805@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Jeff,

Could you give me some information about what your group is doing? A friend of mine and I are working out the details for a SS xcvr and are planning to do a trans-Atlantic QSO.

We don't have any circuits developed yet, but I have been looking through the ARRL SS Sourcebook to get some ideas. Any help you could give would be much appreciated.

Tony, KE4ATO
lanier.r.a@nort.bwi.wec.com

_____ Reply Separator _____
Subject: [SS:68] Re: Pansat equipment
Author: ss@tapr.org at BALT.SMTP
Date: 2/8/96 6:12 PM

>Is there anyone out there that knows what equipment will be required to
>access the Pansat when it goes up? I am very much interested in that mode
>and would like to build some hardware to get familiar with spread spectrum.

There is some PANSAT information on the World-Wide Web. It can be found at http://www.sp.nps.navy.mil/pansat/pansat.html

Some students in a communications course here at TTU are building a demodulator for PANSAT. When the project is completed, in late April, I'll post some information about it to this list.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505 U.S.A.

40. TAPR Comments on the League's SS Petition

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Thu, 29 Feb 1996 06:20:55 -0800
To: ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140b01ad5b64cbfc86@[166.93.9.51]>
Rendered body type: text/plain

Members of TAPR SS List:

Below are the comments that TAPR filed on the League's Spread Spectrum Petition for Rulemaking. It will soon be available on the TAPR website, but I thought that I would post it here for those of you who don't have access to the WWW.

It is still not too late to file any comments that you have on this matter with the FCC. An explanation of the procedure of doing this appears in the League's "FCC Rule Book" publication.

TAPR will be following this matter thru the entire rulemaking process at the Commission. The next step will be to file reply comments which are due at the Commission on March 12th.

-- Dewayne

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
Amendment of Part 97 of the) RM-8737
Commissions Rules Governing)
the Amateur Radio Service to)
Facilitate Spread Spectrum)
Communications)

To: The Commission

COMMENTS OF
TUCSON AMATEUR PACKET RADIO CORPORATION

The Tucson Amateur Packet Radio Corporation ("TAPR") submits these comments in response to the above-referenced petition for rule making (the "Petition") filed by the American Radio Relay League, Incorporated ("ARRL").

BACKGROUND AND STATEMENT OF INTEREST

TAPR is a non-profit (501(c)(3)) scientific and educational organization with more than 2,500 members worldwide. It is chartered to engage in three principal activities: scientific testing and research into the development and improvement of technological systems for use in the amateur radio service including, but not limited to, digital packet radio communications; research and testing of systems, hardware, and software for packet radio local area networks and computer network systems; and disseminating to the public the information obtained as a result of such research and testing.

TAPR was founded in 1982 as a national organization with interests in the areas of packet and digital communications. It grew out of a 1981 effort to design a packet radio Terminal Node Controller, or "TNC," that would be available to amateurs at a modest cost. From these initial designs emerged what is now the de facto standard in amateur and many commercial packet radio operations.

Today, TAPR continues as an international, membership-supported research and development organization for the amateur radio community. TAPR continues to develop new communications technology, provide kits for the amateur community, and promote the advancement of the amateur art through publications, meetings, and communications standards. TAPR also maintains a web site (http://www.tapr.org), which includes a page specifically addressing current amateur spread spectrum issues (http://www.tapr.org/ss).

DISCUSSION

TAPR generally supports the recommendations made by the ARRL in its Petition. Spread Spectrum ("SS") technology has not made great advances in the amateur radio service since it was first permitted in 1985, in part due to the fact that, by today's standards, the Part 97 regulations on amateur spread spectrum are extremely restrictive. In particular, the small number of fixed spreading codes permitted under Section 97.311(d)(1) inhibits the use and development of SS by amateur radio stations. TAPR believes that it is in the public interest, and in the interest of the amateur radio service, to change the rules for SS in order to accelerate the adoption of SS by the general amateur community.

TAPR also supports many of the specific recommendations made by the ARRL.

First, TAPR supports the ARRL's request to modify Part 97.311(b) as it pertains to the unintentional triggering of repeater inputs. This section is redundant with other parts of the Commission's rules and, therefore, is unnecessary.

Second, TAPR supports the ARRL's request to delete sections 97.311(c) and (d), in order to permit SS emissions and spreading codes that are not currently authorized. Elimination of the rule that dictates specific spreading codes is necessary to facilitate further experimentation and to match the provisions allowed under an existing amateur service SS STA, discussed below. In addition, it would facilitate the use and adoption by amateur radio operators of Part 15 SS equipment and hardware.

Third, TAPR supports the ARRL's proposed change to 97.311(g), which would provide for automatic transmitter power control to limit the output power of an SS station to that which is required for communication, when more than one watt of output power is used. TAPR, however, differs with the ARRL as to just how simple this requirement would be to implement technically. While TAPR agrees that technically it is simple to control the output power of a transmitter, it is quite another matter to make this control automatic and foolproof. If the Commission decides to proceed with this particular change to the rules, it should phase the change in over some reasonable period of time, in order to give the amateur community the opportunity to develop and deploy SS equipment that properly can meet this requirement.

While, as noted above, TAPR agrees with many of the ARRL's recommendations,

it disagrees with a few of the proposals contained in the Petition.

In particular, TAPR differs with the ARRL with respect to the question of which frequencies should be authorized for SS emissions. In the Petition, the ARRL proposes that brief test transmissions of SS emissions be permitted only on those frequency bands in which SS emissions currently are

authorized. TAPR believes that SS emissions should be allowed on all frequency bands covered by the SS STA currently held by Mr. Robert Buaas K6KGS (6m and 2m, in addition to the frequency bands currently authorized by Part 97). In addition, the Commission should allow SS emissions in the 219-210 MHz band, which was authorized for use by the amateur radio service after the Buaas SS STA was originally granted in 1992. Finally, the Commission should not impose any restriction on the length of time SS emissions are transmitted. Ample time already has been provided for the experimental phase of SS usage in the amateur service (five years of experimentation under the 1980 AMRAD STA and ten years under the current Part 97 rules), and it is now time to allow SS use without restriction.

TAPR also differs with the ARRL as to how station identification and documentation should be handled under a revised set of rules. The ARRL in its petition did not ask the Commission to delete sections 97.311(e) and 97.119(b)(5) of the rules, even though it questioned the practicality of the requirements set forth in these sections. TAPR, in contrast, recommends that the Commission delete these subsections of the rules. The interference and harm to the band in which an SS station is operating that would be caused by a requirement to use a CW identification outweighs the benefits that would accrue for monitoring purposes from the use of the ID.

As a result, the amateur radio community should be permitted to develop an approach for handling the necessary functions of monitoring and identification. TAPR already is working on possible resolutions to this problem and in the near future will be in a position to make a proposal to the Commission on this matter.

CONCLUSION

SS technology can provide many useful benefits to the amateur radio community if its use becomes more widespread and mainstream. In order to accomplish this, however, certain changes must be made to the Commission's rules governing the use of SS in the amateur radio service. By making these changes, the Commission will create a regulatory environment that will give members of the amateur radio service enough flexibility to develop innovative equipment and hardware employing SS technology.

For these reasons, TAPR urges the Commission promptly to issue a notice of proposed rule making to facilitate spread spectrum communications in the amateur radio service, as proposed in the Petition and as modified herein.

Respectfully submitted,

THE TUCSON AMATEUR PACKET RADIO CORPORATION

By:

Dewayne Hendricks
Tucson Amateur Packet Radio Corporation
8987-309 E Tanque Verde Rd #337
Tucson, Arizona 85749-9399
(817) 383-0000

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Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AppleLink: D6547
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! AOL: HENDRICKS
Fax: (510) 770-9854 ! WWW: <http://www.warpspeed.com/>
~~~~~~

March 1996

Original source file: ss.9603
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9603

1. Spread Spectrum in the UK

From: VINCENT@rmcs.cranfield.ac.uk
Date: Fri, 1 Mar 1996 13:46:00 GMT
To: ss@tapr.org
Message-ID: <960301134600.86d@rmcs.cranfield.ac.uk>
Rendered body type: text/plain

I have been following this SIG recently and thought I should let
people know what I have been doing with SS in the UK !

I have been experimenting with Direct Sequence Spread Spectrum on
the 70 cm band for a few years. I had to get special permission
from the UK Radiocommunication Agency to experiment with SS under
the terms of my amateur licence.

I have constructed a number of DSS systems the first being based
on the Practical Direct-Sequence Spread Spectrum UHF Link
published by Andre Ke
steloot in QST (May 1989) and re-published
in the ARRL Spread Spectrum Sourcebook.

This was followed by my own design for a digital voice 32 kbit/s
direct sequence transmitter with a companion delay-locked loop
receiver, which was published in Electronics and Wireless World
(Voice Link over Spread Spectrum Radio, September and October
1993).

After the initial euphoria of getting the system to work, being
unable to find anyone to talk to with this mode led to the system
being put away in a
cupboard ! However I am thinking of
re-visiting the design, simplifying it and hopefully improving
its' performance.

I would very interested in hearing from anyone who is
experimenting with SS techniques and in particular DS
delay-locked/Tau-Dither loops and BPSK carrier recovery systems.
I am also keen to find out if anyone has successfully constructed
a working hybrid frequency- hopping direct sequence system.

I am hoping that there will be some active discussion on
practical SS in this
group and that it will motivate me to do
some more experiments with this mode.

Regards

James Vincent G1PVZ

Internet: vincent@rmcs.cranfield.ac.uk
Packet: G1PVZ@GB7TJF.#45.GBR.EU

2. Re: [SS:87] Spread Spectrum in the UK

From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Fri, 1 Mar 1996 09:34:10 -0800 (PST)
To: VINCENT@rmcs.cranfield.ac.uk
Cc: ss@tapr.org
Message-ID: <Pine.OSF.3.91.960301092856.26374C-100000@biggulp.callamer.com>
Rendered body type: text/plain

James. The system described in QST for May 89 works well. Indeed I
understand not getting local interest, as at first it seems building two
of each breadboard is necessary. We have been experimenting with BPSK
systems, primarily addressing some of the locking difficulties in Andre's
system. BTW, do check the AMRAD BBS for updates on this very item.
Information is easily gotten and provided. Cliff Buttschardt W6HDO

On Fri, 1 Mar 1996 VINCENT@rmcs.cranfield.ac.uk wrote:

> I have been following this SIG recently and thought I should let
> people know what I have been doing with SS in the UK !
>
> I have been experimenting with Direct Sequence Spread Spectrum on

> the 70 cm band for a few years. I had to get special permission
> from the UK Radiocommunication Agency to experiment with SS under
> the terms of my amateur licence.
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> I have constructed a number of DSS systems the first being based
> on the Practical Direct-Sequence Spread Spectrum UHF Link
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> steloot in QST (May 1989) and re-published
> in the ARRL Spread Spectrum Sourcebook.
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> This was followed by my own design for a digital voice 32 kbit/s
> direct sequence transmitter with a companion delay-locked loop
> receiver, which was published in Electronics and Wireless World
> (Voice Link over Spread Spectrum Radio, September and October
> 1993).
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> After the initial euphoria of getting the system to work, being
> unable to find anyone to talk to with this mode led to the system
> being put away in a
> cupboard ! However I am thinking of
> re-visiting the design, simplifying it and hopefully improving
> its' performance.
>
> I would very interested in hearing from anyone who is
> experimenting with SS techniques and in particular DS
> delay-locked/Tau-Dither loops and BPSK carrier recovery systems.
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> a working hybrid frequency- hopping direct sequence system.
>
> I am hoping that there will be some active discussion on
> practical SS in this
> group and that it will motivate me to do
> some more experiments with this mode.
>
> Regards
>
> James Vincent G1PVZ
>
> Internet: vincent@rmcs.cranfield.ac.uk
> Packet: G1PVZ@GB7TJF.#45.GBR.EU
>
>

3. Re: [SS:87] Spread Spectrum in the UK

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 1 Mar 1996 10:05:40 -0800 (PST)
To: ss@tapr.org
Message-ID: <199603011805.AA072493541@hpsadr2.sr.hp.com>
Rendered body type: text/plain

> I would very interested in hearing from anyone who is
> experimenting with SS techniques and in particular DS
> delay-locked/Tau-Dither loops and BPSK carrier recovery systems.
> I am also keen to find out if anyone has successfully constructed
> a working hybrid frequency- hopping direct sequence system.
>
> I am hoping that there will be some active discussion on
> practical SS in this
> group and that it will motivate me to do
> some more experiments with this mode.
>

James
  Thanks for posting about your interests and activities. I also have
been experimenting and building and am currently working on 1265 DSSS,
direct conversion, fully synchronous system.
    I have experimented with a couple of recovery methods and now hope
to be able to use the full synchronism along with a conventional PLL to
advantage and let much or all of the acquisition be done with s/w.
See the web page for details.

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|

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|                                                                          |
|       ftp://col.hp.com/hamradio/packet/n6gn/index.html                   |
|                                                                          |
|--------------------------------------------------------------------------|
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4. Re: [SS:87] Spread Spectrum in the UK

```
From: "Steven R. Bible" <srbible@mindport.net>
Date: Fri, 01 Mar 1996 16:16:07 -0500
To: ss@tapr.org
Cc: VINCENT@rmcs.cranfield.ac.uk
Message-ID: <1.5.4b11.32.19960301211607.0069c754@mindport.net>
Rendered body type: text/plain
```

At 09:38 AM 3/1/96 -0600, you wrote:
[snip]
>This was followed by my own design for a digital voice 32 kbit/s
>direct sequence transmitter with a companion delay-locked loop
>receiver, which was published in Electronics and Wireless World
>(Voice Link over Spread Spectrum Radio, September and October
>1993).

Hello James,

I have heard of your article and have tried to get a copy of it, but to no avail. I am sure if the readers of this list were to read your article there would be much to comment on. Could there perhaps be a way we can post your article on the Web? What are the copywrite permissions needed from Electronics and Wireless World. I'd be glad to help you get the article posted on the www.tapr.org web server. Or perhaps you have an update article to post.

Just some thoughts.

73,

- Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

5. newbie lookie for basic info

```
From: "Ralph Ward" <rw@TXCC.NET>
Date: Fri, 1 Mar 1996 18:51:55 -0600
To: ss@tapr.org
Message-ID: <199603020049.SAA25672@txcc.net>
Rendered body type: text/plain
```

I am new to SS and would like a source of basic info...does anyone have suggestions?
Ralph Ward
rw@txcc.net

6. Re: Cliff W6HDO/WB6RIJ STA use

```
From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Sat, 2 Mar 1996 14:09:31 -0800 (PST)
To: "Robert A. Buaas" <buaas@wireless.net>
Cc: ss@tapr.org
Message-ID: <Pine.OSF.3.91.960302134336.26333B-100000@biggulp.callamer.com>
Rendered body type: text/plain
```

Hi Bob...Many thanks for the reply. I did indeed get your address off the TAPR home page, which in itself is a miricle as I have had nothing but difficulty getting any sort of information using FTP connections.

Just minutes ago, WB6RIJ and I had a long CW QSO on the 1750 meter band! Both of us running one watt to fifty foot antennas. We use this band as any sort of emmision is allowed. Thus it is called the "experimenters band". You might have read of some of my efforts getting very weak signal, slow BPSK popularized. I have a one character per second ASCII beacon on 187.65 KHz, 24 hours a day. Just as soon as we know more, spread spectrum will be considered, probably on the ham bands since the incremental bandwidth allows SOME help! Bill is way ahead on this and has some breadboards completed. We would like to eventually use some HF ham band if you thought this at all possbile. If by your experience this would be impossible, then we will simply continue on the 1750 meter band.
     You have no worry about my violating the weak signal guys as I am one of them myself---probably more so than a SS experimenter. When my friends see my involvement, you probably can follow the mushroom cloud

generated. Secondly, I am the nearest AMSAT area coordinator to the PANSAT project in Monterey. The devil of it is that I know little of SS and need some practical help! Both Bill and I have struck out on our own as a natural phase from slow BPSK to SS. Therefore, I would like to file your comments (with a copy to Bill) for the moment and listen to suggestions that might be made. I do try and read the TAPR HF SIG in order to bridge these two requirements, but I see little similarity presently.
     Again thanks for your help and more later on. Cliff Buttschardt W6HDO

7. Re: [SS:87] Spread Spectrum in the UK

From: Dirk-Jan Koopman <djk@dirku.demon.co.uk>
Date: Sun, 3 Mar 1996 09:51:47 +0000 (GMT)
To: ss@tapr.org
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960303094227.195A-100000@dirku.demon.co.uk>
Rendered body type: text/plain

On Fri, 1 Mar 1996 VINCENT@rmcs.cranfield.ac.uk wrote:

> I have been following this SIG recently and thought I should let
> people know what I have been doing with SS in the UK !
>
> I have been experimenting with Direct Sequence Spread Spectrum on
> the 70 cm band for a few years. I had to get special permission
> from the UK Radiocommunication Agency to experiment with SS under
> the terms of my amateur licence.
>

I have been trying to get a response out of the RA about this matter for sometime, without success. However, after carefully reading my BR68 (UK version of Part 97), there is nothing actually in there which prohibits the use of SS - in fact it actually says "If band spreading techniques are used, then the most efficient method should be employed".

A facet of the common law in England is that, to quote Lord Denning, "you can do whatever you like, so long as there isn't a law agin it".

Perhaps you could tell us the problem you had with the RA (and who with).

> I have constructed a number of DSS systems the first being based
> on the Practical Direct-Sequence Spread Spectrum UHF Link
> published by Andre Ke
> steloot in QST (May 1989) and re-published
> in the ARRL Spread Spectrum Sourcebook.
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> direct sequence transmitter with a companion delay-locked loop
> receiver, which was published in Electronics and Wireless World
> (Voice Link over Spread Spectrum Radio, September and October
> 1993).
>

It may be of interest that Harris as currently sampling a 2400 Mhz five chip SS set which takes binary in one end and chucks SS out the other and vice versa to at least part 15 rf levels and up to 2Mbps.

--
Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@dirku.demon.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than the piano when played by a sister or near relation." --Oscar Wilde

8. Re: [SS:93] Re: Spread Spectrum in the UK

From: Jim Sanford <JSANFORD@INFI.NET>
Date: Sun, 03 Mar 1996 08:54:08 -0500
To: ss@tapr.org
Message-ID: <199603031354.IAA32676@mh004.infi.net>
Rendered body type: text/plain

Dirk:
Any idea where, how, how much ($$) for the samples????
Thanks & 73, Jim wb4gcs@amsat.org

At 03:47 AM 3/3/96 -0600, you wrote:
>On Fri, 1 Mar 1996 VINCENT@rmcs.cranfield.ac.uk wrote:
>
>> I have been following this SIG recently and thought I should let
>> people know what I have been doing with SS in the UK !
>>

>> I have been experimenting with Direct Sequence Spread Spectrum on
>> the 70 cm band for a few years. I had to get special permission
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>> steloot in QST (May 1989) and re-published
>> in the ARRL Spread Spectrum Sourcebook.
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>> (Voice Link over Spread Spectrum Radio, September and October
>> 1993).
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>
>It may be of interest that Harris as currently sampling a 2400 Mhz five chip
>SS set which takes binary in one end and chucks SS out the other and vice
>versa to at least part 15 rf levels and up to 2Mbps.
>
>--
>Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
>Computer Consultant   Email: djk@dirku.demon.co.uk or G1TLH@GB7TLH.#35.GBR.EU
>"The typewriting machine, when played with expression, is no more annoying than
>the piano when played by a sister or near relation." --Oscar Wilde
>
>

9. Harris Chip Set (was Spread Spectrum in the UK)

From: "Steven R. Bible" <srbible@mindport.net>
Date: Sun, 03 Mar 1996 10:31:10 -0500
To: ss@tapr.org
Message-ID: <1.5.4b11.32.19960303153110.006a0934@mindport.net>
Rendered body type: text/plain

At 08:18 AM 3/3/96 -0600, you wrote:
>Dirk:
>Any idea where, how, how much ($$) for the samples????
>Thanks & 73, Jim wb4gcs@amsat.org

Back in November I phoned Harris Semiconductor Sales Office Headquarters in
Melbourne, FL (1-800-442-7747). Talked with Dana. There doesn't seemed to
be much on the chipset at this time since it is in pre-production (remember,
this was November). Here's what she did tell me price (rough) wise. I
would not hang my hat on these. Plus, I am not sure if this is small qtys
or not.

HFA3524	Dual Synthesizer	$13.30
HFA3624	RF/IF Converter	$12.00
HFA3724	Quad IF Modulator	$26.00
HSP3824	DSSS Baseband Processor	not available (this is the big chip)
HFA3924	RFPA	not available

The good news is that she said they will be doing an evaluation unit. Alas,
no info other than it will be available early next year (Jan - Feb).

She gave me the number to Advanced Technical Sales in Mass. (508-644-0888).
They had no info. They are going to try and get me some pre-production
samples. I have not heard back from these people.

Another thing to pay attention to in this chip set is that the portion of
the 2.4 GHz band is uses is not entirely in the primary portion of the
amateur band that we have.

Here is the URL

http://www.semi.harris.com/datasheets/wireless/wireless_family.html

Guess it's time to get back on the phone.

73,

- Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

10. Re: [SS:95] Harris Chip Set (was Spread Spectrum in the UK)

From: Dirk-Jan Koopman <djk@dirku.demon.co.uk>
Date: Sun, 3 Mar 1996 18:37:38 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960303183558.195C-100000@dirku.demon.co.uk>
Rendered body type: text/plain

On Sun, 3 Mar 1996, Steven R. Bible wrote:

> Another thing to pay attention to in this chip set is that the portion of
> the 2.4 GHz band is uses is not entirely in the primary portion of the
> amateur band that we have.
>

That _YOU_ have - none of our bit of the 2400Mhz band is primary :-(

Dirk

--
Dirk-Jan Koopman Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant Email: djk@dirku.demon.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

11. Re: [SS:96] Re: Harris Chip Set (was Spread Spectrum in the UK)

From: "Steven R. Bible" <srbible@mindport.net>
Date: Sun, 03 Mar 1996 17:41:57 -0500
To: ss@tapr.org
Message-ID: <1.5.4b11.32.19960303224157.00675d2c@mindport.net>
Rendered body type: text/plain

At 12:40 PM 3/3/96 -0600, you wrote:
>On Sun, 3 Mar 1996, Steven R. Bible wrote:
>
>> Another thing to pay attention to in this chip set is that the portion of
>> the 2.4 GHz band is uses is not entirely in the primary portion of the
>> amateur band that we have.
>>
>
>That _YOU_ have - none of our bit of the 2400Mhz band is primary :-(

Sorry about that Dirk, I should pay closer attention that this is an
International list :-).

73,

- Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

12. Re: [SS:95] Harris Chip Set

From: buaas@wireless.net (Robert A. Buaas)
Date: Sun, 3 Mar 1996 21:04:08 -0800 (PST)
To: ss@tapr.org
Message-ID: <199603040504.VAA06241@wireless.net>
Rendered body type: text/plain

>At 08:18 AM 3/3/96 -0600, you wrote:
>>Dirk:
>>Any idea where, how, how much ($$) for the samples????
>>Thanks & 73, Jim wb4gcs@amsat.org
[large snip]

Hi Everyone--

Regards this chipset: one of it's market targets is IEEE 802.11
using the DS PHY (There are 3 different PHY's specified in .11:
a FHSS using NB GFSK, the subject DSSS, and IR). The DS PHY is patterned
very much after the AT&T(NCR) WaveLAN technology which uses an
11-bit Barker code to do the spreading of a DQPSK-coded data stream.
As specified in .11, each "channel" is ~~22 MHz wide, allowing 4
non-overlapping channels in the 83+ MHz allocated for FCC Part-15
operations. (Things are different in Japan and Europe.)

As you might imagine, an 11-bit spreading sequence doesn't give
much spreading gain or jam immunity or help with delay spread, and DQPSK
is not a very robust modulation in the face of interference. This does
work great for fairly short ranges and for medium range with high
gain/highly directional/no sidelobe antennas.

I've seen a (very) preliminary datasheet. There are additional
spreading sequences and code lengths supported. We won't really
know the ultimate usage potential for this product until it
comes out. Stay tuned...

best regards to all.

bob/K6KGS

13. SS Web Page Update

From: Greg Jones <wd5ivd@tapr.org>
Date: Mon, 4 Mar 1996 00:42:48 -0600 (CST)
To: ss@tapr.org
Message-ID: <199603040642.AAA17784@tapr.org>
Rendered body type: text/plain

Just added to the SS Page.

The comments that we have on RM-8737 are posted. We will be keeping this as
up to date as possible as we get comments from others to post.

Also -- I have added the Ham Radio and More Show of 6.13.93 on Spread
Spectrum.

Cheers - Greg

14. Re: [SS:97] Re: Harris Chip Set (was Spread Spectrum in the UK)

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Mon, 4 Mar 1996 09:50:52 -0500 (EST)
To: ss@tapr.org
Message-ID: <199603041450.JAA30123@hydra.carleton.ca>
Rendered body type: text/plain

Steve Bible wrote:
> >
> >> Another thing to pay attention to in this chip set is that the portion of
> >> the 2.4 GHz band is uses is not entirely in the primary portion of the
> >> amateur band that we have.
> >>
> >
> >That _YOU_ have - none of our bit of the 2400Mhz band is primary :-(
>
> Sorry about that Dirk, I should pay closer attention that this is an
> International list :-).

Same situation in Canada - we are only secondary users of the amateur bands
above 225 MHz. On the other hand, we do have 150 MHz to play with at
2.3 - 2.45 GHz, and it appears that we can do SS there right now, with no
regulatory changes needed.

Whilst looking at the new chip sets coming down the pike, I've been
contemplating getting some commercial 2.4 GHz hardware to try out and get
my feet wet (so to speak). The problem is to identify something that could
be confined to the amateur subband so as to avoid the unlicenced/ISM ERP
restrictions. The only product that seems to fill the bill off-the-shelf
is one of the WaveLAN variants which operates in the 2.4 - 2.45 GHz segment.
I suspect that they may not be readily obtainable here, although I haven't
really tried yet. Also, as Bob points out in another posting, WaveLAN is not
very robust due to its low processing gain - it barely qualifies as SS.
I want a WaveLAN with 2.375 GHz center frequency and 70 MHz chipping rate!
But off-the-shelf WaveLANs may have to do for starters, if I can get them.
One attractive aspect of WaveLAN is the existence of a Linux driver for it.

Do any other possibilities come to mind? Any chance of pulling the
synthesizer in something like the Proxim FH modem down so it hops in the
2.3 - 2.45 GHz range?

My biggest handicap right now is that I've never actually had my hands on
any of this hardware... but I know some of you guys have. Comments?

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

15. 1996 ARRL and TAPR Digital Communications Conference

From: Greg Jones <wd5ivd@tapr.org>
Date: Mon, 4 Mar 1996 15:52:53 -0600 (CST)
To: netsig@tapr.org (NETSIG mailing), bbssig@tapr.org (BBS SIG mailing),
aprssig@tapr.org (BBS SIG mailing), hfsig@tapr.org (HF SIG mailing),
dsp-93@tapr.org (DSP-93 Build), ss@tapr.org, tapr-tnc@tapr.org
Message-ID: <199603042152.PAA21342@tapr.org>
Rendered body type: text/plain

Press Release. Please distribute as widely as possible. http://www.tapr.org
March 1st, 1996

ARRL and TAPR Digital Communications Conference
September 20-22, 1996
Seattle, WA, U.S.A.

1996 ARRL and TAPR Digital Communications Conference

Mark your calendar and start making plans to attend the year's premier event
in amateur radio digital communications --

The 1996 ARRL and TAPR Digital Communications Conference will be held
September 20-22, 1996, in Seattle, Washington -- just minutes from the
SeaTac Airport. Local sponsors include the Puget Sound Amateur Radio TCP/IP
Group and Boeing Employees Amateur Radio Society (BEARS).

The ARRL and TAPR Digital Communications Conference is an international
forum for radio amateurs and experts in digital communications, networking,
and related technologies to meet, publish their work, and present new ideas
and techniques for discussion. Presenters and attendees will have the
opportunity to exchange ideas and learn about recent hardware and software
advances, theories, experimental results, and practical applications. This
year marks the first year in which the ARRL Digital Communications
Conference and TAPR Annual General Meeting have joined into one conference!

Anyone interested in digital communications is invited to submit a paper for
publication in the Conference Proceedings. Presentation at the Conference
is not required for publication. Papers are due by July 23, 1996, and
should be submitted to Maty Weinberg, ARRL, 225 Main St., Newington, CT
06111 U.S.A. or via Internet at lweinberg@arrl.org. Please contact Maty for
detailed format requirements. Papers are due by July 23, 1996

ARRL and TAPR especially welcome papers from full time students to compete
for the first annual student papers award. Two $500 travel awards will be
given, one in each of the following categories: a) best
technical/theory-oriented paper by a student, and b) best educational or
community-oriented application paper by a student. The paper should relate
directly to a wireless digital communication topic (see guidelines for more
information). Papers coauthored by educators or telecommunications
professionals are also eligible for this award, as long as a student is the
first author. First year awards have been funded through a grant by The
ARRL Foundation, Inc. Deadline for receipt of finished student paper
manuscript: June 11, 1996. Please note that this deadline is different than
the general conference submission date. For full details and paper
guidelines, contact TAPR or check http://www.tapr.org.

The current schedule has a workshop and student papers on Friday afternoon.
Conference Papers, Introductory thread, Lunch, and Dinner on Saturday.
Sunday will have additional paper sessions, if necessary, as well as one or
more workshops. Workshops will include Keith Sproul, WU2Z, on APRS
packet-location software, Dewayne Hendricks, WA8DZP , on "How to utilize
Part 15 Radios for Ham Applications" and a workshop on Wireless Networking
using WA4DSY 56K RF modem technology and its accessories. See the advanced

registration form for more details as well as http://www.tapr.org

For more information on the Conference, registration, and hotel reservations
please contact TAPR at the address below.

TAPR Office:
8987-309 E. Tanque Verde Rd. #337
Tucson, AZ 85749-9399
Phone: (817) 383-0000
Fax: (817) 566-2544

Internet E-Mail: tapr@tapr.org
Internet Web: http://www.tapr.org

16. Solar Car

From: Stephen Webb <swebb@iastate.edu>
Date: Mon, 04 Mar 1996 16:45:16 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19960304224516.0067dd1c@pop-1.iastate.edu>
Rendered body type: text/plain

Hi

I am from the Iowa State Solar Car Team. We are looking for a plans to a SS
device or just to buy one some where.
 I do not know a lot about SS, but I can tell you that we are thinking of
using 900 mhz or 2.4 mhz. The main reason that we need to use SS is to over
come the high RF noise for the big electric motor that is at most 4 feet
away. We have eliminated line noise by filters.
Does any one know where we can start looking for plans to build a device or
to buy a pre-build device. I have one company out of Orlando,Fl named
Aero-Repco Sales. But I would like to shop around a little.

Any Help or Info will be appreciated!!!

Thanks
Stephen Webb
Iowa State Solar Car Team
http://www.public.iastate.edu/~prisum

17. Re: [SS:102] Solar Car

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Tue, 5 Mar 1996 08:45:16 -0500
To: ss@tapr.org
Message-ID: <13c45d20@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Stephen,

     I am working on a SS xcvr, but unfortuantly, it is in the development
     stages right now. I have llok for a SS kit or something similar to it,
     but to no avail. Since I live in Orlando, I would like to know more
     about the company that you contacted. I would like to know what you
     have found out.

     Sincerely,

     Tony KE4ATO
     lanier.r.a@wec.com

_____ Reply Separator _____
Subject: [SS:102] Solar Car
Author: ss@tapr.org at BALT.SMTP
Date: 3/4/ 0 4:53 PM

Hi

I am from the Iowa State Solar Car Team. We are looking for a plans to a SS
device or just to buy one some where.
 I do not know a lot about SS, but I can tell you that we are thinking of
using 900 mhz or 2.4 mhz. The main reason that we need to use SS is to over
come the high RF noise for the big electric motor that is at most 4 feet
away. We have eliminated line noise by filters.
Does any one know where we can start looking for plans to build a device or
to buy a pre-build device. I have one company out of Orlando,Fl named
Aero-Repco Sales. But I would like to shop around a little.

Any Help or Info will be appreciated!!!

Thanks
Stephen Webb
Iowa State Solar Car Team
http://www.public.iastate.edu/~prisum

18. SS Comments

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 5 Mar 1996 19:10:15 -0600 (CST)
To: ss@tapr.org
Message-ID: <199603060110.TAA24315@tapr.org>
Rendered body type: text/plain

I have added the comments from National Communications System, 2/26/96
to the rules page on the http://www.tapr.org/ss

Had some very interesting comments.

Greg

19. Re: [SS:102] Solar Car

From: Jeff Millar <jeff@wa1hco.mv.com>
Date: Tue, 05 Mar 1996 20:57:27 -0500
To: ss@tapr.org
Message-ID: <199603060156.UAA12718@bort.mv.net>
Rendered body type: text/plain

At 04:53 PM 3/4/96 -0600, you wrote:
>Hi
>
>I am from the Iowa State Solar Car Team. We are looking for a plans to a SS
>device or just to buy one some where.
> I do not know a lot about SS, but I can tell you that we are thinking of
>using 900 mhz or 2.4 mhz. The main reason that we need to use SS is to over
>come the high RF noise for the big electric motor that is at most 4 feet
>away. We have eliminated line noise by filters.

Spread Spectrum works against interference by spreading narrow bandwidth
emissions
into noise-like, lower peak power, signals. Since the motor already puts
out noise-
like emissions, it seems that spread spectrum would not gain an advantage.
In fact,
a narrow band emission such as FM with 1:1 deviation would allow a narrow
receiver
bandwidth thus rejecting more noise and improving signal to noise ratio over
the link.

jeff, wa1hco

20. File your comments in RM-8737!

From: Mike Cheponis <mac@ns1.culver.net>
Date: Tue, 5 Mar 1996 20:22:23 -0800 (PST)
To: ss@tapr.org
Message-ID: <199603060422.UAA04182@ns1.culver.net>
Rendered body type: text/plain

[US Only Information follows. Sorry for the QRM to our non-US list members.]

There are people on this list who have better information than this, but I
just got a call from our Pacific Division Director and he mentions that
comments in RM-8737 were filed by: SCRRBA (apparently very thoughtful
comments), MAC (Mid-Atlantic repeater group), NCF, John Mock KD6PAG,
AMSAT, San Bernadino Microwave Society, the Indiana Repeater Council,
Amateur Television Quarterly, and the comments that are already
on the TAPR SS Web Page.

Basically, Brad (the Director) says that the comments against SS fall
predictably:

1) SS will screw up repeater inputs

2) Weak signal guys will be wiped out.

So, when you file your Reply Comments, please specifically answer why SS

won't cause problems for repeaters or weak signal guys.

-Mike K3MC

(p.s. As for me, I had to write my Reply Comments early, and did not include
any support for why SS is compatible with repeaters & weak signals. :-( )

21. Re: Solar Car

From: wb9mjn@wb9mjn.ampr.org
Date: Tue, 05 Mar 96 22:54:26 UTC
To: ss@tapr.org
Message-ID: <9415@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi,

 SS is probably not a plus or a minus in this situation. SS should probably
be considered, based on the goals of the project tho. To train young eng-
ineers. It should help avoid problem with clock harmonics, too. Being close
to an electric car motor, means ur going to be closed to the digital elect-
ronics that control the big switching devices too.

 Lets consider the problem without SS first, tho. This problem is the very
problem that led to the invention of FM. A guy named Armstrong needed a
way to communicate between army tanks, that were powered by spark ignition
engines. AM was pretty useless, mostly because it was limited to the band-
widths a 1:1 FM signal would have.

 The impulse noise is passed thru a filter, the IF filter. In the time domain,
the output of the impulse is aproximately SinX/X since the IF filter is
aproximately a rectangular frequency response. That is, the output of the
IF has approximately a SinX/X envelope.

 The SinX/X time width is controlled by the IF band width in an inverse
relationship. The narrower the BW, the broader the pulse, and lower its amp-
litude. In close proximity to an engine, the impulse almost always overpowers
any distant VHF source mixed into the IF, with a practical signal BW, how-
ever.

 So, how did Armstrong get around this? He widened the IF BW. Thus, the
impulse signal out the IF could be filtered out, since its components were
now higher in frequency than the Modulation. To regain signal S/N performance,
he also had to widen the FM deviation of the signal, until it approximately
fit into the widened IF BW.

 This was all well and good, but now the system had a Threshold Effect. So,
sufficient transmitter power needed to be used to get the signal above the
threshold effect. The Broadcast FM system is exactly such a system. It uses
a signal and IF BW approximately 10 times wider than the modulation BW.

 If ur looking for a simple solution, wideband FM is what u need.

 If u then put SS on top of the wideband FM, you should have a very reliable
system. The only disadvantage with this is that it needs a transmitter that
is more powerful than more sophisticated technigues might permit.

 Narrowband modems along with Foward Error Correction would be a more
sophisticated technigue that would give larger range, or permit lower power,
or more simultaneous users in a given BW. But this might be too much to
do for the time/personell you have. Noise blankers have also been successfully
used, but are prone to IMD difficulties. That is, as ur car speeds up it
xx the blanker would mix in farther out and farther out adjacent channels.

  73, Don.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%n0eir.ampr.org@hydra-gw.carleton.ca

22. RM-8737 has been updated

From: Greg Jones <wd5ivd@tapr.org>
Date: Wed, 6 Mar 1996 02:54:53 -0600 (CST)
To: ss@tapr.org
Message-ID: <199603060854.CAA21001@tapr.org>

Rendered body type: text/plain

The RM-8737 page on www.tapr.org/ss has been updated with new comments and reply comments.

Cheers - Greg

23. Re: [SS:106] File your comments in RM-8737!

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 6 Mar 1996 15:05:51 -0500
To: ss@tapr.org
Message-ID: <13df0680@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Exactly HOW will SS not do what they are claiming it will do? I have a very good idea, but I would like to hear what you have to say.

73s de Tony, KE4ATO
laniert.r.a@nort.bwi.wec.com

_____ Reply Separator _____
Subject: [SS:106] File your comments in RM-8737!
Author: ss@tapr.org at BALT.SMTP
Date: 3/5/ 0 10:27 PM

[US Only Information follows. Sorry for the QRM to our non-US list members.]

There are people on this list who have better information than this, but I just got a call from our Pacific Division Director and he mentions that comments in RM-8737 were filed by: SCRRBA (apparently very thoughtful comments), MAC (Mid-Atlantic repeater group), NCF, John Mock KD6PAG, AMSAT, San Bernadino Microwave Society, the Indiana Repeater Council, Amateur Television Quarterly, and the comments that are already on the TAPR SS Web Page.

Basically, Brad (the Director) says that the comments against SS fall predictably:

1) SS will screw up repeater inputs

2) Weak signal guys will be wiped out.

So, when you file your Reply Comments, please specifically answer why SS won't cause problems for repeaters or weak signal guys.

-Mike K3MC

(p.s. As for me, I had to write my Reply Comments early, and did not include any support for why SS is compatible with repeaters & weak signals. :-( )

24. Re: [SS:105] Re: Solar Car

From: Stephen Webb <swebb@iastate.edu>
Date: Wed, 06 Mar 1996 15:32:56 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19960306213256.00680750@pop-1.iastate.edu>
Rendered body type: text/plain

Thank for all your help. I will bring it up at our meeting. If anyone out is willing to help us build this radio link you are welcome to. Email mail me and I will get you in contact with others in our group.

Thanks again,
Stephen Webb
Iowa State Solar Car Team
http://www.public.iastate.edu/~prisum

25. Re: [SS:103] Re: Solar Car

From: Stephen Webb <swebb@iastate.edu>
Date: Wed, 06 Mar 1996 15:32:53 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19960306213253.0068fb88@pop-1.iastate.edu>
Rendered body type: text/plain

At 11:38 AM 3/5/96 -0600, you wrote:
> Stephen,

>
>   I am working on a SS xcvr, but unfortuantly, it is in the development
>   stages right now. I have llok for a SS kit or something similar to it,
>   but to no avail. Since I live in Orlando, I would like to know more
>   about the company that you contacted. I would like to know what you
>   have found out.
>
>   Sincerely,
>
>   Tony KE4ATO
>   lanier.r.a@wec.com
 Thanks any way. The company that I found was:
Aerotron-Repco Sales, Inc.
2400 Sandlake Road
Orlando, FL 32809-7666
ph: 407-856-1953
fax:407-856-1960
 The person that I talked to was one M.Steve Penick. He is the Telemetry
Sales Manager.

Thanks again,
Stephen Webb
Iowa State Solar Car Team
http://www.public.iastate.edu/~prisum

26. The battle is joined...

From: Phil Karn <karn@qualcomm.com>
Date: Wed, 6 Mar 1996 17:50:54 -0800 (PST)
To: ss@tapr.org
Message-ID: <199603070150.RAA14783@servo.qualcomm.com>
Rendered body type: text/plain

Date: Wed, 6 Mar 1996 18:38:29 -0500 (EST)
From: "Robert J. Carpenter" <rcarpen@DGS.dgsys.com>
To: Phil Karn <karn>
Cc: biltynan@ktc.com, Jevon.Lieberg-1@tc.umn.edu, w3iwi@amsat.org,
        n7hpr@amsat.org, wd5ivd@tapr.org
Subject: Re: CSVHFS Conference
In-Reply-To: <199603061913.LAA13762@servo.qualcomm.com>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

On Wed, 6 Mar 1996, Phil Karn wrote:

> Hi Bob,
>
> I see I succeeded in drawing you out. :-)
>
> >   SS station 100 W ERP   +20 dBW
> >   If spread over 1 MHz   -40 dBW/Hz
> >free-space attenuation of 20 km at 432 MHz   -110 dB
> >   SS signal at 20 km   -150 dBW/Hz
>
> Where do you get 100W? With power control and reasonably efficient
> modulation and FEC, the average required EIRP for data rates of a few
> kilobits/sec over a few miles at 900 MHz is more like a few
> milliwatts. That's for fading mobile communications using typical omni
> vehicle antennas. The number goes down even more when you're
> stationary, or use gain antennas. We (Qualcomm) have tons of data from
> our CDMA field tests to back up these figures.

  You choose an unrealistic situation. No one is going to accept "a few
kilobits per second" of Web-style communication for live-motion video or
file transfer, or even still pictures. Let's look into the future, not
the past. I was assuming a central node of a "local" network having high
power, but at considerable distance. While users might have gain antennas
inside their apartments, I doubt that they will work as well as an outdoor
mobile antenna (attenuation of walls, etc.). Let's look, also, at the 1 W
SS (into your assumed gain antenna) that the ham down the street is
allowed to run WITHOUT automatic power control. With a tiny 10 dB gain
antenna, that's within 10 dB of the 100 w ERP I used in my example, but
much closer than 20 km. How about the deafening noise bursts the
narrow-band station would hear?

> So try dropping your EIRP by about 50 dB. Also you could include

  No. You talk about kilobits per second, I talk about megabits per

second. Considering local 1-W SS stations, I might even **increase**
my estimate of damage to the noise floor.

> antenna F/B and F/S ratios at the weak signal stations, unless it
> is common for such stations to operate with omni antennas.

  And what says that the SS station isn't in the same direction as the
desired weak station? The worst F/B and F/S lobes are often no better
than 10 to 20 dB down.

> All you've shown is that automatic power control and strong FEC is
> necessary for an efficient spread spectrum system. This is something
> we've known for a long time. It's why I worded the automatic power
> control language in the ARRL proposal the way I did.

  No, I have shown that automatic power control will "turn up the wick" as
much as needed to beat its way into nasty indoor environments at a
distance of many kilometers. How about quoting the power required to work
hand-helds inside buildings? Also, you seem to be assuming the commercial
SS world, with lots of cells spaced 1 to 5 miles apart on 150 foot towers
with land-lines to them. The PCS people are trying to get these tower
swept under the zoning exception that the electrical utilities have for
their poles. Lots of people are fighting this. What makes you assume
that hams won't put a big central node station on the one high place they
can find, like in the present repeater world? And even worse, you
disregard the nearby ham running 1W of SS.

> We hams need to start thinking about spectrum as a multi-dimensional
> resource. Besides bandwidth, there's power and time. These trade off
> against each other in nonlinear and often surprisingly nonintuitive
> ways. In particular, spread systems have shown that you can often do
> much better overall by controlling power instead of bandwidth.
>
> These ideas are not new. See "Poisson, Shannon and the Radio Amateur"
> by John Costas, K2EN. He published in 1959!

  These statements are not germane to this discussion. We're talking
about interference from SS to narrow-band modes. Costas was selling
systems with statistics similar to SS. He considers their performance,
and interference TO them, but not interference BY them to narrow-band
systems. Costas only considers the **largest** number of stations that
can use a given band of frequencies. He doesn't consider interference to
the narrow band users trying to work DX on these frequencies.

  In fact Costas states, "Amateur band operation with broad-band systems
will prove to be somewhat different in certain respects. There will be
fewer stations with which contact may be made (SINCE WEAKER SIGNALS WHICH
WERE FORMERLY HEARD INTERMITTENTLY WILL NOW NOT BE HEARD AT ALL) [my
emphasis], but once contact is established the conversation can be
expected to continue without interruption for a considerable period of
time. Since the amateur is not normally concerned with communicating with
a specific person [tell *that* to a DXer], the exchange of some freedom of
choice of possible contacts for reliability of communications will
probably be welcomed." And this is assuming all stations use his
SS-equivalent mode, not considering interference to narrower modes.

  It is well known that SS systems are quite tolerant of narrow-band
interference. But isn't it true that SS has problems when the interfering
narrow carrier becomes roughly the spreading factor times the SS power;
ie. a 1 MHz bit rate spread to 20 MHz might tolerate a carrier 13-16 dB
above the SS total received power, at which point the SS error rate soars.

  Costas also shows in his equation 25, that without interfering stations,
and with high duty cycle, narrow-band stations make very efficient use of
bandwidth. This describes serious weak signal operation; camping on a DX
station's frequency to get through the pileup or overcome weak signals,
continuously calling to work meteors, ...

> Phil

  Sorry to always take issue, but our views of ham radio differ so
greatly. I stand by my numbers as being representative (not exact) if SS
grows the way I hope and expect.

        73 de Bob w3otc

27. Hopelessly defeatest?

From: Robert.Glassey@nmp.nokia.com
Date: Thu, 7 Mar 96 11:27:03 +0000
To: ss@tapr.org
Message-ID: <H000029201442dae@MHS>
Rendered body type: text/plain

Hi all,

Here's my 2 cents, for what 2 cents is worth these days.

It seems to me (and I'm no wizard on these matters, I'm only trying to keep up with the play here) that Wide band and Narrow band modes are inherent incompatible.

Sure, in theory, A SS system has resistance to narrow band signals, and conversly, the noise seen by a narrowband mode is almost insignificant at a distance, but there are limits, and the real world situation seems to have little regard for the different 'nice operating practices' dictated by the different philosphies of each mode.

For a start, the only power control on narrow band modes is 400W pep! (UK) and the only bandwidth control on SS modes is the width of the allocated band. Each limitation is fine when dealing with another system of the same type, but a 400W narrow band signal in a SS band, would render SS useless, and even a 10mW SS TX 1 km away would render narrow band modes useless for all but local repeater work. The problems is that each mode deals with interference in incompatible ways.

Say we have a 10mW SS transmitter spread over 1MHz, operating at 64kbps. (any less and its not worth bothering with). Lets say the reciever needs -100dbm total power, this seems realistic cf digital celular rx levels., allowing for 10dB fade margin. The max pathloss is -110dB, or free space loss over 20kM. This assumes we have a line of sight path, ie to/from a repeater/node on a hill/high building.

Now suppose someone else 20km way, has a 1W narrowband transmitter (pretty likely). The SS system would need 20dB interference resistance, and would fall over, since processing gain would be only 12dB. It would then have to increase its power to 1W just to cope. Now if the narrow band station was only 200m away, the SS system needs 10 kilowatts!

The noise floor at the narrowband reciever (10KHz bandwidth) 20km away is 20dB below what the SS system would see, ie -120dbm. No so bad, but then the SS system has to increase its power to 1W to cope with the 1W narrow band transmitter. So the noise floor is now -100dBm, that could seriously piss off a DXer. But the chances are that the 1W repeater user is much closer than 20kM, and quite regularly within 1km. The SS system will need to be at least 100W to cope, then every narrow band user within 100km would be out to get the SS operators head on a stake!

It no longer looks like SS is resistant to narrow band users. Rather it appears that SS is extreemly sensitive to narrow band users due to their lack of power control.

In a shared channel, most narrow band users could cope with a co-existing SS system (although they would get pissed off every time their neighbourly SS user powered up), but SS systems would just fall flat on their face.

Now I'm a fan of SS, really I am, but I just can't see any possible way for both narrow and wideband modes to co-exist on the same band. All the benifits of SS go out the window as soon as anyone fires up their handheld.

Therefore a SS system MUST have an exclusive SS allocation, where no narrow band modes are allowed. Only then can you get the benifits of CDMA, and the spectral efficency that SS promises.

This suggestion is of course highly political, and is probably doomed to failure from the start.

I can almost hear people saying 'more procecssing gain' but if the system cant do significantly more than 9600bps, forget it, the 21st century is almost upon us. But perhaps a 100MHz spead at 10GHz or higher is possible. This seems to be the only way of getting more resistance and causing less interference, but there's still the near-far problem with the narrow modes.

Sorry to be such a spoil sport, but like most of you I'm sure, I too would very much like to see how this problem can be got around. But it

seems pretty tricky to me.

At least to me the major benifit of SS would be in creating an efficient high speed radio WAN, without the multi access problems of packet.

Cheers,

Rob, G0VTQ

28. Re: [SS:113] Hopelessly defeatest?

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 7 Mar 1996 10:41:49 -0500
To: ss@tapr.org
Message-ID: <13f03e80@smtpgty.bwi.wec.com>
Rendered body type: text/plain

If all of this is true, then why has the military been so successful in implementing SS? If it truely did cause the interference as stated here, why would SS be used for satellite communications for deep-space probes (at least that is what I was told) ??

There is a flaw in the agruement here. If SS operates in the noise floor of a typical CW/SSB transceiver, how is this going to cause interference to a neighbooring repeater or other operator? This point was not specificly brought out in the discussion below. I strongly disagree that a SS system with 10mW output would cause *significant* interference as to render anything but a repeater useless is absurd! 10mW is very little power! We need to educate the public as to EXACTLY what SS is, what it does, and how will (will not) affect other users of the frequency spectrum.

And I thought the conservatives had it hard...

73s de KE4ATO

Tony
lanier.r.a@nort.bwi.wec.com

_____ Reply Separator _____
Subject: [SS:113] Hopelessly defeatest?
Author: ss@tapr.org at BALT.SMTP
Date: 3/7/96 5:42 AM

Hi all,

Here's my 2 cents, for what 2 cents is worth these days.

It seems to me (and I'm no wizard on these matters, I'm only trying to keep up with the play here) that Wide band and Narrow band modes are inherent incompatible.

Sure, in theory, A SS system has resistance to narrow band signals, and conversly, the noise seen by a narrowband mode is almost insignificant at a distance, but there are limits, and the real world situation seems to have little regard for the different 'nice operating practices' dictated by the different philosphies of each mode.

For a start, the only power control on narrow band modes is 400W pep! (UK) and the only bandwidth control on SS modes is the width of the allocated band. Each limitation is fine when dealing with another system of the same type, but a 400W narrow band signal in a SS band, would render SS useless, and even a 10mW SS TX 1 km away would render narrow band modes useless for all but local repeater work. The problems is that each mode deals with interference in incompatible ways.

Say we have a 10mW SS transmitter spread over 1MHz, operating at 64kbps. (any less and its not worth bothering with). Lets say the reciever needs -100dbm total power, this seems realistic cf digital celular rx levels., allowing for 10dB fade margin. The max pathloss is -110dB, or free space loss over 20kM. This assumes we have a line of sight path, ie to/from a repeater/node on a hill/high building.

Now suppose someone else 20km way, has a 1W narrowband transmitter (pretty likely). The SS system would need 20dB interference resistance, and would fall over, since processing gain would be only 12dB. It would then have to increase its power to 1W just to cope. Now if the narrow

band station was only 200m away, the SS system needs 10 kilowatts!

The noise floor at the narrowband reciever (10KHz bandwidth) 20km away is 20dB below what the SS system would see, ie -120dbm. No so bad, but then the SS system has to increase its power to 1W to cope with the 1W narrow band transmitter. So the noise floor is now -100dBm, that could seriously piss off a DXer. But the chances are that the 1W repeater user is much closer than 20kM, and quite regularly within 1km. The SS system will need to be at least 100W to cope, then every narrow band user within 100km would be out to get the SS operators head on a stake!

It no longer looks like SS is resistant to narrow band users. Rather it appears that SS is extreemly sensitive to narrow band users due to their lack of power control.

In a shared channel, most narrow band users could cope with a co-existing SS system (although they would get pissed off every time their neighbourly SS user powered up), but SS systems would just fall flat on their face.

Now I'm a fan of SS, really I am, but I just can't see any possible way for both narrow and wideband modes to co-exist on the same band. All the benifits of SS go out the window as soon as anyone fires up their handheld.

Therefore a SS system MUST have an exclusive SS allocation, where no narrow band modes are allowed. Only then can you get the benifits of CDMA, and the spectral efficency that SS promises.

This suggestion is of course highly political, and is probably doomed to failure from the start.

I can almost hear people saying 'more procecssing gain' but if the system cant do significantly more than 9600bps, forget it, the 21st century is almost upon us. But perhaps a 100MHz spead at 10GHz or higher is possible. This seems to be the only way of getting more resistance and causing less interference, but there's still the near-far problem with the narrow modes.

Sorry to be such a spoil sport, but like most of you I'm sure, I too would very much like to see how this problem can be got around. But it seems pretty tricky to me.

At least to me the major benifit of SS would be in creating an efficient high speed radio WAN, without the multi access problems of packet.

Cheers,

Rob, G0VTQ

29. Hope after all?

From: Robert.Glassey@nmp.nokia.com
Date: Thu, 7 Mar 96 15:12:08 +0000
To: ss@tapr.org
Message-ID: <H00002920144bbae@MHS>
Rendered body type: text/plain

Hi again,

I seem to have pretty much convinced myself that simple Direct Sequence SS is unworkable in an amateur enviroment (quite different from the nicely controlled and structured cellular enviroment), but...

How about Frequency Hopping?

At least interference to SS systems from narrow modes is limited to one time slot in N per narrow band user, regardless of narrow mode power. Also the hopping sequence could be dynamically adjusted so that it does not transmit on top of narrow band transmissions, or in DX segments of the band (eg only repeater input/output bands for example, ovoiding local repeater input frequencies).

Then as the number of users increase you get problems with the number collisions, resulting in wipeouts or errors. I'm not too sure about this but it seems to me that you loose the gracefull degradation that makes SS so good at shareing channels. Perhaps Slow hopping combined with slow DSSS will provide a fast DSSS like system with much more control over where the interference goes.

People working DX repeaters could have problems, but then you could just use the input frequencies of repeaters that are 20km away or greater, so we know we wont cause interference. A local SS hub could transmit data on go/no-go frequences in the area, and suitable hopping sequences to use. Even coordinate the cumulative knowledge of what frequencies are in use by narrow modes.

And if a DX operator does get interference he can just pulse his TX (or take one over or CQ) on the frequency and the SS system will ovoid the frequency from then on.

Been thunk of right?

Comments?

Rob G0VTQ

30. Re: [SS:113] Hopelessly defeatest?

From: buaas@wireless.net (Robert A. Buaas)
Date: Thu, 7 Mar 1996 08:55:40 -0800 (PST)
To: ss@tapr.org
Message-ID: <199603071655.IAA13165@wireless.net>
Rendered body type: text/plain

Hello Rob--

[snip]
>Say we have a 10mW SS transmitter spread over 1MHz, operating at 64kbps.
[snip]
> processing gain would be only 12dB.
[large snip]
>Rob, G0VTQ

If I understand your assumptions correctly, you're hoping for error-free 1 bit/Hz from the modulation scheme, and spreading the 64 KHz NB signal by a factor of 16 gets you to 1 MHz width and 12 dB gain. I think the difficulty starts with your using the above assumption as part of your system design; frankly, I don't know of a radio system with this little amount of margin that isn't "hopelessly defeated" (as you so elegantly put it) from the start. But lets go even a litte further in the direction you're going: say you spread over 10 MHz, to push the gain up to 22 dB. Will the system work even then? Well, given the other assumptions about the channel (presence of NB emitters), probably not.

To illustrate my point: your proposed system might actually work, but only UNTIL the first NB user wants to use any part of the spectrum. At that moment, both of you are out of luck. Major denial of service. More likely, you're completely out of luck and depending on the dynamics at the moment, he might be out of luck.

What's happening here is what Richard Hamming once called "narrow thinking" in one of his lectures about Claude Shannon's work at Bell Labs. His thesis was, usually there is more than one way to approach any given problem. More specifically, Spread Spectrum can take many forms, not just the Direct Sequence model you've assumed. How well your system performs for you, and how much interference it causes other potential users, is very much a function of the set of criteria you use in defining your solution, and what weights you give those criteria.

Let's recast your situation: let say, instead, you break up your 1 MHz into 16 "channels", and your radio is now frequency agile instead of code agile. (Yes, I know this is the classic Frequency Hopping SS model, but bear with me for a moment...) We still have only 12 dB of process gain, but let's see how well THIS model performs. You're dancing around the spectrum (not really required but say you are anyway), and that first NB user wants in. What happens? You have one packet in 16 blasted, and he looses out for one-SIXTEENTH of his transmission. I'm sure you can do the arithmetic for the 22 dB case. This model illustrates why FH is so popular. Just the same, as attractive as this is, you've given up some things you get with DS, and you should identify what they are and how they influence your performance and interference profiles. This is but one of many possible alternatives worth considering, both singly and in combination(s). I am purposefully stopping here.

The point of my comments are: (a) things aren't as bleak as you imagined, and more importantly (b) good engineering practice, when it is practiced, DOES PREVAIL. I'm sure you are a good engineer; look back

on what you learned in engineering school: it wasn't the particular solutions to the problems of the time that were important, it was the method you learned for approaching them. The solutions of that time are now obselete, yet we continue to move forward. Why is that? To move on, we need objectivity and openness. Think carefully before you leap, or speak. What you say tells a lot about your limitations. So much of what's happening with this thread is the result of narrow thinking, where the highest priority criteria in the system model is to maintain the status quo. I suggest that priority should be given to methods which simultaneously maximize throughput and minimize interference. These are, after all, the same goal.

Successful examples of SS systems abound in other radio services. Why is that? Why are they so hard for us to recognize? One (of many) answers is that we compare apples (performance of these existing systems) and oranges (our requirements), and surprisingly, we come up with fruit salad instead of clarity. None of the existing systems were designed with our requirements in mind, so it shouldn't be too surprising that they wouldn't perform well for us. Maybe it's time for some original work on our part?

just some food for thought...

best regards/bob K6KGS

31. Re: [SS:109] Re: File your comments in RM-8737!

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Thu, 7 Mar 1996 08:57:18 -0800 (PST)
To: ss@tapr.org (LANIER.R.A-)
Message-ID: <199603071657.AA202167838@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Tony, KE4ATO writes:

> Exactly HOW will SS not do what they are claiming it will do? I have a
> very good idea, but I would like to hear what you have to say.

It seems to me that blanket statements either condemning or defending SS as a potential interferer in an environment of non-SS users are, at best, suspect.
The best answer to the question of whether or not interference will be encountered might be "It depends how well amateurs can work together".

The repeater guys generally will start noticing when their C/N is degraded to the point of approaching FM threshold, perhaps 10-15 dB below their weakest usable signal level. The absolute level of their noise floor will be considerably higher than the weak signal guys but they are significantly wider to start with so offer a bigger target for QRN/QRM.

Just for discussion we might consider each of these two types to experience a problem when interference from SS equals their noise floor, even though the repeater guys often operate with significant margin. If the repeater channels are 20 KHz wide and limited by KTB (T>=290 because their antennas are pointed at terra firma) we might estimate ~-130 dBm floor. The weak signal channels could be 200 Hz wide with noise around ~-150 dBm. A few EME types using antennas looking at cold sky might be a few dB below this, say -156 dBm in 100 Hz for the sake of argument.

So, interference might be noticable when the SS offender produces at least -130 dBm in 20 KHz or -153 dBm in 200 Hz. These numbers represent similar spectral power densities.

It seems like the problem can be divided into two parts, stating the necessary transmit power in the unwanted receiver's bandwidth and stating the coupling between that transmitter and receiver.

If the potential interferer is thoroughly spread so that peak/average the SS signal is truly noise like and not coherent from the particular receiver's point of view, then trouble happens when:

(Transmitter power - RF isolation), measured in nb-user's bw, is greater than the user's noise floor.

or

Po - Gp - 10*log(BWss/BWnb) - I >= -156 dBm

for the weak signal guy with BWnb=100Hz and

```
        Po - Gp - 10*log(BWss/BWnb) - I >= -130 dBm
        for the repeater user with BWnb= 20 KHz

with,
        P0      = Pout(dBm)
        Gp      = processing gain
        BWss    = SSuser's-BW
        BWnb    = narrowband-user's BW
        I       = RFisolation between transmitter and receiver

Looking at the above, things that help minimize interference are

        o       Antenna directivity, which reduces Po along with

        o       Antenna directivity, which increases isolation due to
                lower sidelobes

        o       power control (sets Po to minimum necessary),

        o       Good path ( no obstructions) between SS user's which minimizes
                required Po

        o       Small spacial separation between SS users

        o       Bad path (obstructions) between SS user and NB user

        o       Large spacial separation between NB and SS users

        o       SS signal sufficiently spread (long enough PN or fast
                enough hopping)

        o       low information rate for SS users (not a goal)

        o       Small spacial separation between NB users (not under SS
                system's control)

        o       Large Gp, spread as much as you can (or better yet,hop around
                nb user)


  Much of the above list deals with areas which imply system planning,
coordination and cooperation and not technical issues isolated from
the other users of the band.  While the absolute interference levels on
the right side of the equation may be fairly definable, the rest of the
variables are just that, quite variable.
  It can be fairly easy to prove or disprove interference in any
particular case based on different assumptions.  Over a quality path,
with a SS user thoroughly spread with a lot of processing gain and
directional antennas with polarity isolation on the two different
systems, the interfering power delivered to a particular narrowband
user's receiver might be shown to be far below his noise floor.
  OTOH, if the same two systems try to share a site and common tower
space, it might be extremely difficult to reduce the coupling enough to
coexist.  If paths are long and bad things can get still worse.

  It also occurs to me that built into the resolution of this SS/NB
interference question is the need for a way of considering occupation
which is different from that which amateurs are accustomed.  Don't we
all have to start thinking in terms of "The *band* is occupied in that
direction, with such-and-such polarization in a particular time slot"
rather than just "The channel is busy"?  This is true for both SS and NB
users.  As such, it will require formerly less-coordinated users on
either "side of the fence" to be more concerned with other's uses and
success.  This may be a difficult prospect for amateurs.

  There may be greater value in promoting SS in a way which helps every
amateur recognize its value to him/her and therefor sets a climate of
cooperation than in the best laid technical plans or system design.

  I'm convinced of the value of SS for high speed information transfer
over radio but unless that notion becomes common enough to generate good
will we may not see any widespread usage or acceptance.

Glenn Elmore n6gn
```

32. Re: [SS:117] Re: File your comments in RM-8737!

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 07 Mar 96 12:20:20 UTC
To: ss@tapr.org
Message-ID: <9432@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi,

 It seems to me that FH SS is a natural for the Ham Bands where FM activity exists.

 FM is designed to be tolerant of impulse noise. FH, properly implimented will appear as nothing but impulse noise to the FM Voice reciever.

 Apparent rules of thumb, that come to mind are these. The FH system must be a "fast" FH system. That is hop rate must be greater than and equal to the data signalling rate. Also, the data rate must be 10 times greater than the maximun audio BW. Or 30 KBaud in most cases.

 Hams today live with power line, car ignition and other forms of impulse noise in their everyday FM Voice operations. What makes FH any different than just some more impulse noise?

 At present technological FH limitations, FH seems ideal for the FM portions of 2 meters and 70 cm. bands. Sure, its not going to deliver on all the needed aspects of SS, but it does reuse frequencies. It does not key up repeaters, it does not cause any more interferance than already exists in the enviorment.

 Ooops, in the Rules-of-thumb paragraph, that should read "greater than and/or equal to the data signalling rate".

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%n0eir.ampr.org@hydra-gw.carleton.ca

33. Re: [SS:117] Re: File your comments in RM-8737!

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 07 Mar 96 12:34:21 UTC
To: ss@tapr.org
Message-ID: <9434@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi,

 On DSSS systems. These do need to have their own spectrum on thebands below 1 Ghz.

 On the bands below 1 Ghz, antennas to sufficiently directionalise emissions are large and expensive, and impractical for all users.

 DSSS while not neccassarily linked to channel sharing, has to be on the bands below 1 Ghz. Consequently, the noise floor to a narrow band user cannot be controlled. 30 DSSS users is going to be quite a noise floor! And there is no way around this, but to use CDMA.

 So, we need SS reservations on these bands.

 We should be able to find a 1 or 2 Mhz contiguous SS reservation on 6 meters, i would hope. But I m not an expert on 6 meters.

 On 2 meters, i can t see any DSSS operation.

 On 440, the 420 to 431 and 433 to 435 could be made DSSS reservations. How individual groups would use these frequencies is yet to be deteremined. SS is not packet only pursuit.

 What about ATV in these spectrums? I think the writing has been on the wall for traditional ATV for many years now. Either it must find a way to share commercial broadcast spectrum, or it must Packetise and fit in with a data communications future. Will ATV turn into PTV ? That s really the whole crux of using or loosing the lower half of the 70 cm in the USA. Its been lost already in the rest of North America. A Canadian permission to allow DSSS in the U.S. protection zone would go along way to helping DSSS on 440 happen however.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%n0eir.ampr.org@hydra-gw.carleton.ca

34. Re: [SS:116] Re: Hopelessly defeatest?

From: Dirk-Jan Koopman <djk@dirku.demon.co.uk>
Date: Thu, 7 Mar 1996 19:35:20 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960307191851.5623F-100000@dirku.demon.co.uk>
Rendered body type: text/plain

On Thu, 7 Mar 1996, Robert A. Buaas wrote:

[snip snip snip]
> What's happening here is what Richard Hamming once called "narrow
> thinking" in one of his lectures about Claude Shannon's work at Bell
> Labs. His thesis was, usually there is more than one way to approach any
> given problem. More specifically, Spread Spectrum can take many
> forms, not just the Direct Sequence model you've assumed. How well
> your system performs for you, and how much interference it causes
> other potential users, is very much a function of the set of criteria
> you use in defining your solution, and what weights you give those
> criteria.
>

Yup.

Nobody on this SIG seems to have mentioned FEC in any of this. Are we
ignoring this or simply assuming it is a waste of time?

Apart from Phil KA9Q, I have yet to meet amateurs who are truely convinced
of the merits of FEC / HAMMING / VITERBI / whoever codes for
communications in amateur service. I am a programmer, not a theorist, and
have always been deeply suspicious of the concept of 'wasting' bits -
until I implimented a UK MPT1327 'codeword' system commercially (this is 6
bytes data, 2 bytes FEC giving 1 and mostly 2 bit error correction) [this
is the system used on european trunked radio control channels and is the
basis of the ETSI PMR data standard].

As I understand it, this isn't the world's greatest FEC system, but by heck
it is a _lot_ better than vanilla HDLC and ax25.

Surely if one is using a reasonably robust FEC system (such as the
sequential decoding system proposed by Phil on his web site) using any SS
system, then the presence of the NB signal isn't going to have that much
effect. You also have the advantage of the coding gain given by the FEC
system itself.

Just to show my complete ignorance on SS matters, I have always thought
that FH systems were inherently more appropriate for amateur use simply
because the commercial people thought too difficult to implement
succesfully (at a reasonable price) (oh and the fact that I don't, quite,
understand how DS works has nothing to do with it at all, honest....)

--
Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@dirku.demon.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

35. Re: [SS:106] File your comments in RM-8737!

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Thu, 7 Mar 1996 14:33:22 -0600 (CST)
To: ss@tapr.org
Message-ID: <199603072033.OAA08903@solar.cs.tamu.edu>
Rendered body type: text/plain

Mike Cheponis sez:
>
> Basically, Brad (the Director) says that the comments against SS fall
> predictably:
>
> 1) SS will screw up repeater inputs
>
> 2) Weak signal guys will be wiped out.
>

>
> So, when you file your Reply Comments, please specifically answer why SS
> won't cause problems for repeaters or weak signal guys.

I guess I'd be interested in just how SS is, indeed, so polite, since most of the systems are using smaller, and finite PCodes, and from what I've seen, slow hoppers...

While I've been lurking here, I'm not really up to speed on all the technology, so this is not just a slam, but more a request for information.

If I understand things coorectly, a short pcode will tend to concentrate the signal about the central carrier frequency, while a slow hopping routine will result in fairly long (relatively speaking) dwell times on each stop. For the spectral density to be more evenly distributed over a band segment, effectively raising the noise floor, but not causing the appearance of periodic and detectable carriers, the pcode would have to be pretty long, and the hopping algorithm should be pretty fast.

I'd appreciate a brief tutorial of where I went wrong (preferably without flames) so I have a better understanding and further, so I can take the data back to a group of frequency coordinators who have some concerns about his proposal and its impacts on the various repeater operations in the 420-450 range that already exist.

Thanks & 73, Gerry
gerry@cs.tamu.edu
n5jxs@tamu.edu

36. Re: [SS:115] Hope after all?

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Thu, 7 Mar 1996 15:24:16 -0600 (CST)
To: ss@tapr.org
Message-ID: <199603072124.PAA09940@solar.cs.tamu.edu>
Rendered body type: text/plain

Robert.Glassey@nmp.nokia.com sez:
>
> Hi again,
>
> I seem to have pretty much convinced myself that simple Direct Sequence
> SS is unworkable in an amateur enviroment (quite different from the
> nicely controlled and structured cellular enviroment), but...

I've wondered about this and pretty well convinced myself of the same.

> How about Frequency Hopping?
>
> At least interference to SS systems from narrow modes is limited to one
> time slot in N per narrow band user, regardless of narrow mode power.
> Also the hopping sequence could be dynamically adjusted so that it does
> not transmit on top of narrow band transmissions, or in DX segments of
> the band (eg only repeater input/output bands for example, ovoiding
> local repeater input frequencies).

One suggestion I've recently seen advanced by some of the more knowledgable narrowband folk is to intersperce the target channels for hopping between the primary repeater channels. Addumingа 25 khz channel spacing on 70 cm, there's some space right between them. Sidebands should be down far enough to meet the goal of not being heard by the narrowband systems, too.

> Then as the number of users increase you get problems with the number
> collisions, resulting in wipeouts or errors. I'm not too sure about this
> but it seems to me that you loose the gracefull degradation that makes
> SS so good at shareing channels. Perhaps Slow hopping combined with slow
> DSSS will provide a fast DSSS like system with much more control over
> where the interference goes.

Wouldn't fast hopping make you more tolerant to collisions?

Again, since I'm pretty new to this, what am I missing?

73, gerry n5jxs

37. Re: [SS:119] Re: File your comments in RM-8737!

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Thu, 7 Mar 1996 15:36:33 -0600 (CST)
To: ss@tapr.org

Message-ID: <199603072136.PAA10121@solar.cs.tamu.edu>
Rendered body type: text/plain

wb9mjn@wb9mjn.ampr.org sez:
>
> Hi,
> On DSSS systems. These do need to have their own spectrum on thebands below
> 1 Ghz.
> ...
> On 440, the 420 to 431 and 433 to 435 could be made DSSS reservations. How
> individual groups would use these frequencies is yet to be deteremined. SS is
> not packet only pursuit.
>
> What about ATV in these spectrums? I think the writing has been on the wall
> for traditional ATV for many years now. Either it must find a way to share
> commercial broadcast spectrum, or it must Packetise and fit in with a data
> communications future. Will ATV turn into PTV ? That s really the whole
> crux of using or loosing the lower half of the 70 cm in the USA. Its been lost
> already in the rest of North America. A Canadian permission to allow DSSS in
> the U.S. protection zone would go along way to helping DSSS on 440 happen
> however.

Unfortunately, the amount of ATV, high-speed packet and narrow-band link
activity on these subbands will yield a number of complaints if intererence
starts cropping up, or if yet another group claims primacy without working
with the folks already beating out an existance there. In Texas, for example,
narrow band linking is widespread enough to require a coordinator to make sure
the various linked systems don't see cross-talk or interference. There are
enough ATV repeater operations to make it somewhat difficult to make these
folks turn over their investments overnight, too. And the folks who've been
building high-speed packet backbones? Most of their curent operation is
narrowband. While they'd immediately see some _potential_ from SS on 70 cm,
they'd have to shift paradigms AND hardware to get there.

73, Gerry N5JXS
gerry@cs.tamu.edu

38. Re: [SS:117] Re: File your comments in RM-8737!

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 7 Mar 1996 17:21:23 -0500
To: ss@tapr.org
Message-ID: <13f61830@smtpgty.bwi.wec.com>
Rendered body type: text/plain

>Tony, KE4ATO writes:

  >>   Exactly HOW will SS not do what they are claiming it will do? I have
  >>   a very good idea, but I would like to hear what you have to say.

  >It seems to me that blanket statements either condemning or defending
  >SS as a potential interferer in an environment of non-SS users are,
  >at best, suspect.
  >The best answer to the question of whether or not interference will be
  >encountered might be "It depends how well amateurs can work together".

    What I meant by this statement was I have been hearing alot of people
    condemning SS as a modulation scheme because it will raise the noise
    floor, cause repeaters to key inadvertantly, wreak havoc on weak
    signal guys, etc. I even read that SS will cause serious interference
    to radio astronomy (editorial in Astronomy magazine). I do not believe
    this to be true. I have read enough material to know that SS is a
    viable modulation scheme and will no doubt be the choice in the 21st
    century and beyond. I was simply asking for others to state their
    opinions and to back these up with facts, not a gut feeling.

    For the record, have any repeater owners conducted experiments to show
    that SS will cause harmful interference? Has anyone else done this?
    Has anyone conducted experiments to show that SS will cause harmful
    interference to weak signal users? Any real experiences would be a
    definite plus for this debate.

    73s de
    Tony, KE4ATO
    lanier.r.a@nort.bwi.wec.com

39. Re: [SS:124] Re: File your comments in RM-8737!

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 8 Mar 1996 09:37:48 -0800 (PST)

To: ss@tapr.org (LANIER.R.A-)
Message-ID: <199603081737.AA191426669@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Tony, KE4ATO writes:

>
>   What I meant by this statement was I have been hearing alot of people
>   condemning SS as a modulation scheme because it will raise the noise
>   floor, cause repeaters to key inadvertantly, wreak havoc on weak
>   signal guys, etc. I even read that SS will cause serious interference
>   to radio astronomy (editorial in Astronomy magazine). I do not believe
>   this to be true. I have read enough material to know that SS is a
>   viable modulation scheme and will no doubt be the choice in the 21st
>   century and beyond. I was simply asking for others to state their
>   opinions and to back these up with facts, not a gut feeling.

  Tony,

    Yes, that's what I've been hearing too and I certainly didn't mean
anything derogatory or flamelike in my answer. I'm sorry if it came
across that way.

   I posted as I did to try to make the point that although there are
facts and equations which can predict a given outcome, and that although
these facts point to some particular things that can be done to minimize
or eliminate interference in any particular situation that the problem
facing amateur radio is more than just a technical one.

   I neither view SS, per se, as inherently a totally non-interfering
mode or a totally devastating mode with respect to current narrowband
uses of the amateur bands. My response was aimed at any pat answers for
what SS will or will not do. I too have heard the "it will raise the
noise floor by 10 dB" type of quotes. I don't believe that this sort of
statement even makes sense any more than more than "there will never be
any problem with SS/narrowband interference" does.

  I believe that either interference or non-interference can be shown
from the numbers for any particular assumption (power control, FEC,
directional antennas, X amount of processing gain, etc etc) depending on
what other assumptions are made.

  SS and narrowband operation are different and successful coexistence
in an amateur context is going to require cooperation and mutual
understanding. There is no technical "silver bullet".

>   For the record, have any repeater owners conducted experiments to show
>   that SS will cause harmful interference? Has anyone else done this?
>   Has anyone conducted experiments to show that SS will cause harmful
>   interference to weak signal users? Any real experiences would be a
>   definite plus for this debate.

  If you haven't already read them, you might want to look at the
reports by K6KGS made as part of the STA experiments. These seem to be
useful, real world measurements and experiences. However they do not,
in my opinion, provide a blanket answer to all questions of interference
and even if they did I don't believe that such technical answers solve
the problem of fully adapting SS techniques in the general amateur context.

  You asked what is obviously a good question which has already generated
considerable thought and discussion. Please accept my apologies if my
previous response offended you. I didn't intend it that way.

Glenn n6gn

40. Re: [SS:123] Re: File your comments in RM-8737!

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 08 Mar 96 13:07:56 UTC
To: ss@tapr.org
Message-ID: <9455@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Gerry,

 I don t see much problems for narrowband links. These links deal with
TV right now. DSSS is worse than TV in most of the spectrum, since its
has an approximately flat spectral density. Whereas TV has allot of power
concentrated in its 3 carriers.

 As to why TV guys might want to shift paradigm's. YOU said it, ALL those

NARROW BAND LINKs, hi. There are more links, today, than when TV started, and there will be even more next year. They are narrowbanded, and operate in spite of wideband activity around them.

Narrow band links have two options. Reengineer the link budget for the higher noise floor, or go DSSS themselves. A little bit higher antenna, or power , or more directivity. But lets remember, that FM Voice has a threshold effect. Above the threshold, it takes a big change in RF S/N level to have a unit effect in demodulated S/N level. Most links have 20 or 30 dB link budgets, and will probably not even be operationally effected by DSSS.

As far as packet links go, DSSS is better than FH. Impulse noise may not have much effect on Voice, but .5GFSK and MSK is a different matter. Each impulse, if stronger than the received signal makes one bit a 50/50 guess. In packet, that makes each packet that occurs during an impulse a 50/50 guess. Narrowband packet links that coexist with strong FH operations will need FEC. But, hey, those links will probably switch to SS anyway, over time. I personally did not have a real appreatiation for HOW MUCH IMPULSE noise is floating around the VHF spectrum (especially 220!) until installing .5GFSK links. U just don t hear the weaker impulse noise on a voice radio. But, put a spectrum analyzer on the antenna, there it is. It looks like its swishing all thru the spectrum on an anlyzer, but thats just an artifact of the spectrum analyzer sweeping. High antennas in cornfields are really the only sites that are quiet.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org%hydra-gw.carleton.ca

41. Re: [SS:126] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Fri, 8 Mar 1996 15:08:36 -0500
To: ss@tapr.org
Message-ID: <960308150835_345232686@mail06.mail.aol.com>
Rendered body type: text/plain

Sorry to deflate your balloon. No ATV has told me they want to jump from NTSC to any other format. Understand we have put up with other signal iQRM for decades, and what we want to watch is NTSC because that is what you buy at your local TV appliance store, NTSC TV sets. So forget the pie inthe sky TV will go digital. No one in TV land has any interest in digital narrowband, slow scan, cruddy fuzzy pics, threshold effects, poor range, no DX, expensive digital converters, new rx/tx gear. We ar rock bound on NTSC and not moving. Sorry, but thats the euipment available today and the foreseeable future. We do not have an alternative. 73 Henry

42. Re: [SS:125] Re: File your comments in RM-8737!

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 8 Mar 1996 17:16:25 -0500
To: ss@tapr.org
Message-ID: <140b1ff0@smtpgty.bwi.wec.com>
Rendered body type: text/plain

>If you haven't already read them, you might want to look at the
>reports by K6KGS made as part of the STA experiments. These seem to be

I've read some of these, but not all. I think they do point out though, that SS will not be a threat to existing amateur radio communications. I certainly do not see how SS will "raise the noise floor." I'm working on a good response to this statement. I think it is important to back up what one says by good, solid evidence.

>useful, real world measurements and experiences. However they do not,
>in my opinion, provide a blanket answer to all questions of
>interference and even if they did I don't believe that such technical
>answers solve
>the problem of fully adapting SS techniques in the general amateur context.

>You asked what is obviously a good question which has already generated
>considerable thought and discussion. Please accept my apologies if my
>previous response offended you. I didn't intend it that way.

>Glenn n6gn

No offense taken Glenn. I was just trying to clarify what I said, not

respond to a flame :) I wanted to hear from other hams who felt the
way I did and to back up what they said by hard facts, that's all.

Let's keep the debate going!!

Tony, KE4ATO
lanier.r.a@nort.bwi.wec.com

43. Re: [SS:115] Hope after all?

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 8 Mar 1996 17:26:15 -0500
To: ss@tapr.org
Message-ID: <140b4890@smtpgty.bwi.wec.com>
Rendered body type: text/plain

What made you come to the conclusion that DSSS is unworkable in an
amateur environment?

73, Tony

_____ Reply Separator _____
Subject: [SS:115] Hope after all?
Author: ss@tapr.org at BALT.SMTP
Date: 3/7/96 10:23 AM

Hi again,

I seem to have pretty much convinced myself that simple Direct Sequence
SS is unworkable in an amateur enviroment (quite different from the
nicely controlled and structured cellular enviroment), but...

How about Frequency Hopping?

At least interference to SS systems from narrow modes is limited to one
time slot in N per narrow band user, regardless of narrow mode power.
Also the hopping sequence could be dynamically adjusted so that it does
not transmit on top of narrow band transmissions, or in DX segments of
the band (eg only repeater input/output bands for example, ovoiding
local repeater input frequencies).

Then as the number of users increase you get problems with the number
collisions, resulting in wipeouts or errors. I'm not too sure about this
but it seems to me that you loose the gracefull degradation that makes
SS so good at shareing channels. Perhaps Slow hopping combined with slow
DSSS will provide a fast DSSS like system with much more control over
where the interference goes.

People working DX repeaters could have problems, but then you could just
use the input frequencies of repeaters that are 20km away or greater, so
we know we wont cause interference. A local SS hub could transmit data
on go/no-go frequences in the area, and suitable hopping sequences to
use. Even coordinate the cumulative knowledge of what frequencies are in
use by narrow modes.

And if a DX operator does get interference he can just pulse his TX (or
take one over or CQ) on the frequency and the SS system will ovoid the
frequency from then on.

Been thunk of right?

Comments?

Rob G0VTQ

44. Re: [SS:127] Re: File your comments in RM-8737!

From: "Steven R. Bible" <srbible@mindport.net>
Date: Fri, 08 Mar 1996 18:38:21 -0500
To: ss@tapr.org
Message-ID: <1.5.4b11.32.19960308233821.006a6f48@mindport.net>
Rendered body type: text/plain

You mean... there are no experimenters, dreamers, explorers, tinkerers,
researchers, visonarys, courious, inquisitive, or entrepreneur people of
digital TV in amateur radio?

I am saddened that Amateur radio has relegated itself to a group of

appliance operators, and that NTSC, or any other modes, are the only modes I
am allowed to operate because that's all I can buy.

I enjoy Amateur Radio because of its pioneering nature. I enjoy talking to
other Amateurs who try new things because it's fun. They are not afraid to
put two pieces together that have never been put together before and see how
it works. It may work, and it may not.

- Steve N7HPR

At 02:13 PM 3/8/96 -0600, you wrote:
>Sorry to deflate your balloon. No ATV has told me they want to jump from
>NTSC to any other format. Understand we have put up with other signal iQRM
>for decades, and what we want to watch is NTSC because that is what you buy
>at your local TV appliance store, NTSC TV sets. So forget the pie inthe sky
>TV will go digital. No one in TV land has any interest in digital
>narrowband, slow scan, cruddy fuzzy pics, threshold effects, poor range, no
>DX, expensive digital converters, new rx/tx gear. We ar rock bound on NTSC
>and not moving. Sorry, but thats the euipment available today and the
>foreseeable future. We do not have an alternative.   73 Henry

Experience

What is the good of drawing conclusions from experience? I don't deny we
sometimes draw the right conclusions, but don't we just as often draw the
wrong ones?

G. C. Lichtenberg (1742-99), German physicist, philosopher. Aphorisms,
"Notebook F," aph. 123 (written 1765-99; tr. by R. J. Hollingdale, 1990).

 - Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

45. Re: [SS:130] Re: File your comments in RM-8737!

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 09 Mar 1996 00:56:12 -0500
To: ss@tapr.org
Message-ID: <31411D7C.D83D8A3@ici.net>
Rendered body type: text/plain

Steven R. Bible wrote:
>
> You mean... there are no experimenters, dreamers, explorers, tinkerers,
> researchers, visonarys, courious, inquisitive, or entrepreneur people of
> digital TV in amateur radio?
>
> I am saddened that Amateur radio has relegated itself to a group of
> appliance operators, and that NTSC, or any other modes, are the only modes I
> am allowed to operate because that's all I can buy.
>
> I enjoy Amateur Radio because of its pioneering nature. I enjoy talking to
> other Amateurs who try new things because it's fun. They are not afraid to
> put two pieces together that have never been put together before and see how
> it works. It may work, and it may not.
>
> - Steve N7HPR
>
> At 02:13 PM 3/8/96 -0600, you wrote:
> >Sorry to deflate your balloon. No ATV has told me they want to jump from
> >NTSC to any other format. Understand we have put up with other signal iQRM
> >for decades, and what we want to watch is NTSC because that is what you buy
> >at your local TV appliance store, NTSC TV sets. So forget the pie inthe sky
> >TV will go digital. No one in TV land has any interest in digital
> >narrowband, slow scan, cruddy fuzzy pics, threshold effects, poor range, no
> >DX, expensive digital converters, new rx/tx gear. We ar rock bound on NTSC
> >and not moving. Sorry, but thats the euipment available today and the
> >foreseeable future. We do not have an alternative.   73 Henry
>
> Experience
>
> What is the good of drawing conclusions from experience? I don't deny we
> sometimes draw the right conclusions, but don't we just as often draw the
> wrong ones?
>

> G. C. Lichtenberg (1742-99), German physicist, philosopher. Aphorisms,
> "Notebook F," aph. 123 (written 1765-99; tr. by R. J. Hollingdale, 1990).
>
> - Steve, N7HPR
>
> srbible@mindport.net
> n7hpr@amsat.org
> n7hpr@tapr.org
Hi,

    Now you know why I never bothered getting my ticket!

I too prefer going with a digital video stream. The camera to do it
is a Connectix Video Camera. This camera attaches to the parallel port
of a PC computer... you can use any computer that has a parallel port...
as long as you can make sense of the C code and convert it. It should'nt
be a problem. The advantage of going digital video is that you do not
have to digitize a NTSC or PAL signal... it comes out of the CCD camera
in digital!!!!! The IDEA to use Digital Video is an excellent one !!!

You can make your own CCD camera... it's not too difficult. I have the
CCD camera cookbook by Berry / Kanto / Munger , it's a peice of cake

or you can buy the connectix cam for $95.00.... I think the $95 dollar
solution is cheaper.   Building the CCD camera on the TI CCD chip
looks like it can cost $325 or so.

46. Re: [SS:93] Re: Spread Spectrum in the UK

From: Brian Morrison <bdm@fenrir.demon.co.uk>
Date: Sat, 9 Mar 1996 06:16:35 GMT
To: ss@tapr.org
Message-ID: <826352197.4927.0@fenrir.demon.co.uk>
Rendered body type: text/plain

** Reply to note from Dirk-Jan Koopman <djk@dirku.demon.co.uk> 03/03/96 03:47am
-0600
> It may be of interest that Harris as currently sampling a 2400 Mhz five chip
> SS set which takes binary in one end and chucks SS out the other and vice
> versa to at least part 15 rf levels and up to 2Mbps.
>

Apparently the 'volume' price for the Prism chipset is about $50-55, quantity about
100k pieces. I don't know what <10 piece prices would be, but assume about 3:1, then
that's $150 just for the chipset.

Not sure about the exact cost of the additional bits to finish the radio, but you need a
custom SAW filter and a few other bits, so at least $200 for the parts for small
volumes.

--
Brian Morrison   bdm@fenrir.demon.co.uk

 Hubert Rawlinson, in his mid-forties and still unusual..- Viv Stanshall

47. Digital video

From: Steve Stroh <strohs@halcyon.com>
Date: Sat, 9 Mar 1996 07:56:13 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.ULT.3.91.960309074834.14939D-100000@coho.halcyon.com>
Rendered body type: text/plain

Sorry for the off-topic reply...

On Fri, 8 Mar 1996 ATVQ@aol.com wrote:

> Sorry to deflate your balloon. No ATV has told me they want to jump from
> NTSC to any other format.

Perhaps not. But I suspect that there are a LOT of hams that would enjoy
running digital video as just another part of running digital over
radio. Our network in Seattle (multiple 9600 repeaters) runs TCP/IP.
It's simple to add video as yet another protocol running over TCP/IP,
like the Internet's CUCMe. Granted- 9600 isn't nearly fast enough
(although 56K would be, and only 100 KHz BW), and TCP/IP isn't the ideal
protocol for real time data such as video. But, it works, and well
enough, and lets other "modes" (file transfers, e-mail,

keyboard-to-keyboard, digital voice, etc.) use the channel also.

  Understand we have put up with other signal iQRM
> for decades, and what we want to watch is NTSC because that is what you buy
> at your local TV appliance store, NTSC TV sets. So forget the pie inthe sky
> TV will go digital. No one in TV land has any interest in digital
> narrowband, slow scan, cruddy fuzzy pics, threshold effects, poor range, no
> DX, expensive digital converters, new rx/tx gear. We ar rock bound on NTSC
> and not moving. Sorry, but thats the euipment available today and the
> foreseeable future. We do not have an alternative.   73 Henry

But there are LOTS of potential participants that own a decent multimedia
PC that with the addition of a $100 Connectix QuickCam, a little
software, and a 9600 (maybe) or a 56K radio that could be doing "ATV".

Steve N8GNJ

--
Steve Stroh N8GNJ   strohs@halcyon.com | 1996 ARRL & TAPR Dig. Comm.
Amateur Radio TCP/IP n8gnj@sw.n8gnj.ampr.org | Conf. in Seattle Sep. 20-22

48. Re: [SS:130] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Sat, 9 Mar 1996 11:15:25 -0500
To: ss@tapr.org
Message-ID: <960309111524_345999025@emout09.mail.aol.com>
Rendered body type: text/plain

Yes that is the sorry state of ham radio. All appliance operators and no
tinkerers. The only tinkering is in Europe, and what SS folks a a very small
handfull of others are willing to do. It has gotten to expensive, most of us
have to work longer hours so we have less time to tinker and amuse our selves
with Rice Paddy specials from Kenwood Icom, Yaesu etc, from 160 to 1296.
Except for my 440, 900, 1200, 2400 MHz equipment, which is hand built,
everything else is out of the box. On the other hand, my video editing
equipment (over $40,000) does more than I could ever build because it has
chips I cannot buy, let alone design around.
Technology has made most home brewing efforts more effort than reward.
 Except for self satisfaction there is little you can build that cant be
bought for less or does much more for a lot less.   Try building your own
cell phone and make it work as well as Motorola and make it smaller than
their flip phone. Go ahead....
Get the point?
hats off to those who sweat over the soldering iron. But there are darn few
left. Thats why Heathkit went out of business.   The world has changed by
the computer.
73 Henry

49. Re: [SS:131] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Sat, 9 Mar 1996 11:23:30 -0500
To: ss@tapr.org
Message-ID: <960309112329_346005451@mail06.mail.aol.com>
Rendered body type: text/plain

Great the digital camera is now in the computer file. Now what? How are you
going to transmit real time color pictures with sound from your computer?
 Where on the 440 band are you going to DX that digital camera signal that no
one else can receive? How you gonna carry that digital camera and your
486-66 tower computer and a mile of expension cord to fit in your RC
airplane, RC submarine or lap top it in your car?
Why do I need a $1000 computer for a $100 camera and still have no
transmitter/antenna, when I can use a $25 camera, a $99 transmitter and a $1
antenna with a TV set I already own and have a complete two way video station
for under $150.
Get real!   Hey computer video, fun toy, too big, too expensive, for us
common working folks.
    Do I have computer video? I have 2 486-66, with total of 64 meg RAM, 4
Gigbyte in 5 drives, cd roms, tape drives, modems, super VGA's, accelerator
boards, a HP scanner and 3 color/laser printers. It doesnt have one wire to
my $20,000 ham TV station because its crappy video and doesnt add anything to
what I can do in analog for less.
Maybe I'll connect a graphic port out to do titles, something I can do for
$99 in analog land (so why tie up $8,000 computer stations for that?) Want
digital editing? I can do that on one station, a non-linear audio/video
editing system...$14,000 in software/hardware to almost equal the pictures I
can do on my $5,000 sony EVO9700 analog hi-8 dual deck editor.
     Digital isnt there yet, and few hams are going to spend the tens of
thousands I have spent to even begin to do it. Want to do it on a TOaster?

Its atill about $5,000 for a basic system. You still need a camera,
monitors, transmitter, receiver etc.
     We are not interested in 64 x 128 resolution either. Slow scan is great
for stills, we send LIVE action color video.
73 Henry

50. Re: [SS:135] Re: File your comments in RM-8737!

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 09 Mar 1996 19:37:45 -0500
To: ss@tapr.org
Message-ID: <31422459.48A10CE4@ici.net>
Rendered body type: text/plain

ATVQ@aol.com wrote:
>
> Great the digital camera is now in the computer file. Now what? How are you
> going to transmit real time color pictures with sound from your computer?
> Where on the 440 band are you going to DX that digital camera signal that no
> one else can receive? How you gonna carry that digital camera and your
> 486-66 tower computer and a mile of expension cord to fit in your RC
> airplane, RC submarine or lap top it in your car?
> Why do I need a $1000 computer for a $100 camera and still have no
> transmitter/antenna, when I can use a $25 camera, a $99 transmitter and a $1
> antenna with a TV set I already own and have a complete two way video station
> for under $150.
> Get real!   Hey computer video, fun toy, too big, too expensive, for us
> common working folks.
>   Do I have computer video? I have 2 486-66, with total of 64 meg RAM, 4
> Gigbyte in 5 drives, cd roms, tape drives, modems, super VGA's, accelerator
> boards, a HP scanner and 3 color/laser printers. It doesnt have one wire to
> my $20,000 ham TV station because its crappy video and doesnt add anything to
> what I can do in analog for less.
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> digital editing? I can do that on one station, a non-linear audio/video
> editing system...$14,000 in software/hardware to almost equal the pictures I
> can do on my $5,000 sony EVO9700 analog hi-8 dual deck editor.
>   Digital isnt there yet, and few hams are going to spend the tens of
> thousands I have spent to even begin to do it. Want to do it on a TOaster?
> Its atill about $5,000 for a basic system. You still need a camera,
> monitors, transmitter, receiver etc.
>   We are not interested in 64 x 128 resolution either. Slow scan is great
> for stills, we send LIVE action color video.
> 73 Henry
>
Man I guess your not keeping current with the latest packet
transcievers. There are now kits for 56k, 384k, 1.5M / Sec.
Use YAHOO and check out Wireless Modems.
To transmit Digital Video it takes less overhead than to transmit
NTSC , digitize it and then convert it to video again.

Digital Video is possible on 28.8k modems.... we do it all the
time with CuSeeMe... on Linux it works the best and I get 12fps.
On windows you only get 8fps... On the Mac... similar.
Unix is just better suited. Plus I have my setup set to pipe the
digized imaged to cjpeg... each B&W is only 2k

This technology isn't thousands of dollars dude. The Connectix camera
is only 90 bucks.... the computer... well I f you want to run Linux
(free) on a 486DX266 w/8MB of RAM it will run... the camera hoooks into
the parallel port. I tranmit video through my 19.2k spread spectrum
modems all the time. I run at 902-926Mhz. I used the Proxim Modules
and an amp from HyperLink.

51. Re: [SS:134] Re: File your comments in RM-8737!

From: Jerry Normandin <jerryn@ici.net>
Date: Sat, 09 Mar 1996 19:48:30 -0500
To: ss@tapr.org
Message-ID: <314226DE.6E4B296D@ici.net>
Rendered body type: text/plain

ATVQ@aol.com wrote:
>
> Yes that is the sorry state of ham radio. All appliance operators and no
> tinkerers. The only tinkering is in Europe, and what SS folks a a very small
> handfull of others are willing to do. It has gotten to expensive, most of us

> have to work longer hours so we have less time to tinker and amuse our selves
> with Rice Paddy specials from Kenwood Icom, Yaesu etc, from 160 to 1296.
> Except for my 440, 900, 1200, 2400 MHz equipment, which is hand built,
> everything else is out of the box. On the other hand, my video editing
> equipment (over $40,000) does more than I could ever build because it has
> chips I cannot buy, let alone design around.
> Technology has made most home brewing efforts more effort than reward.
> Except for self satisfaction there is little you can build that cant be
> bought for less or does much more for a lot less.   Try building your own
> cell phone and make it work as well as Motorola and make it smaller than
> their flip phone. Go ahead....
> Get the point?
> hats off to those who sweat over the soldering iron. But there are darn few
> left. Thats why Heathkit went out of business.   The world has changed by
> the computer.
> 73 Henry

I tinker. I also don't have my ticket because Amatuer Radio has lost
it's spirit. THANK the ARRL for that. MAN... when I was thinking about
getting my ticket people were only interested in DXing..... getting
numbers. BIG DEAL...   Plus If I put up a repeater w/autopatch
I couldn't use it to order a pizza or use it as a business phone.
You could thank MA BELL for that.   Well I say too bad.
I still experiment. I don't watch much television. I build up projects
based on the 8051 microcontroller, I build up homebrew robots and
also homebew transcievers.   I have also built a LW Radio Beacon.

I think there's an oppurtunity for another company like heathkit. I am
thinking about selling some of my kits online. My oldest sone who is 10
years old loves to build projects with me.... all my projects have been
wirewrapped.

The key word is atrophy I think. Too many of us have become lazy.
I run my own computer consulting business, I put in over 80 hours per
week, plus I play with my kids, spend time with the wife, and still
have time to "tinker" I ownly watch the tube when we rent a decent
movie.

Too many of us want everything now. Instea of building that 2Meter
Radio or Building that packet modem we want to buy it allready made, we
don't want to know hat makes it tick..... well sorry I am not like that

I want to know what makes a device tick.

52. RM-8737 Comments Posted to WWW.TAPR.ORG

From: "Steven R. Bible" <srbible@mindport.net>
Date: Sat, 09 Mar 1996 22:34:35 -0500
To: ss@tapr.org
Message-ID: <1.5.4b11.32.19960310033435.0068e938@mindport.net>
Rendered body type: text/plain

Comments to RM-8737, Ammendment of Part 97 of the Commission's Rules
Governing the Amateur Radio Service to Facilitate Spread Spectrum
Communications are being posted to

   http://www.tapr.org/ss

The following comments are presently posted:

     Southern California Repeater and Remote Base Association (SCRRBA), 2/23/96
     TAPR Comments 2/26/96
     Robert A. Buaas, K6KGS 2/26/96
     National Communications System, 2/26/96
     The Indiana Repeater Council, 2/28/96
     Henry Ruh, KB9FO, Publisher, Amateur Television Quarterly, 2/28/96
     Charles M. Albert, Jr. KC6UFM, 3/4/96
     Mike Cheponis, K3MC 3/4/96

Comments from the following will be posted as time permits:

     Nels Harvey, WA9JOB, 2/20/96
     Witt Brown, WB0CJX, Frequency Coordination Chairman
          of the Mid-America Coordination Council, Inc., 2/26/96
     George Isely, WD9GIG, President
          of the Mid-America Coordination Council, Inc., 2/26/96
     The San Bernardino Microwave Society, 2/20/96
     SouthEastern Repeater Association, Inc., 2/23/96
     John Mock, KD6PAG, 2/27/96

53. Re: [SS:124] Re: File your comments in RM-8737!

From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Sun, 10 Mar 1996 10:22:20 -0800 (PST)
To: "LANIER.R.A-" <LANIER.R.A-@smtpgty.bwi.wec.com>
Cc: ss@tapr.org
Message-ID: <Pine.OSF.3.91.960310101314.4485C-100000@biggulp.callamer.com>
Rendered body type: text/plain

Tony, of course the repeater owners that use FM simply do not realize
that the first twenty db of any FM signal is a dead band of little value.
Until some quieting occurs, there is little if any intellegence, BUT the
weak signal guys have a very valid concern. Let's listen to them and
simply forget the FM guys until they realize they will never be hurt!
Cliff Buttschardt W6HDO

54. Re: [SS:139] Re: File your comments in RM-8737!

From: Mike Cheponis <mac@ns1.culver.net>
Date: Sun, 10 Mar 1996 14:14:25 -0800 (PST)
To: ss@tapr.org
Message-ID: <199603102214.OAA21724@ns1.culver.net>
Rendered body type: text/plain

Clifford Buttschardt says:
>Tony, of course the repeater owners that use FM simply do not realize
>that the first twenty db of any FM signal is a dead band of little value.
>Until some quieting occurs, there is little if any intelligence, BUT the
>weak signal guys have a very valid concern. Let's listen to them and
>simply forget the FM guys until they realize they will never be hurt!
>Cliff Buttschardt W6HDO

I think Cliff is right-on.

The issue of SS with weak-signal can be approached by not putting SS
sideband energy into weak-signal subbands when people are trying to work
weak-signal. (We'll ignore for the moment how SS may actually help
weak-signal guys.)

This has always been handled by "Gentleman's Agreement". We have places on
our bands for various mutually exclusive modes.

Remember when that "packet racket" first burned up 145.01 around the country?
And then started expanding to more and more FM simplex frequencies? What
happened was existing modes accommodated packet into their bandplans.

The other thing I'm noticing in this discussion is that we seem to be
attacking each other. When it comes to frequencies, "United we stand,
divided we fall!"

I also enjoy wideband ATV, with its high fidelity video, and I also like
computer video. I'm eager to watch AHDTV video transmitted in a 6 MHz channel.
I like VHF/UHF weak-signal, packet, and - gosh! - SS.

I think it would be best for us all if we worked together so that everybody
can enjoy the hobby to the fullest. This I think means accommodating all
modes.

I would also like to point out that SS is - right now! - legal on the ham
bands. What the ARRL petition is asking, among other things, is allowing
other spreading codes.

SS is here to stay!

-Mike K3MC

55. Re: [SS:133] Digital video

From: ATVQ@aol.com
Date: Mon, 11 Mar 1996 10:27:07 -0500
To: ss@tapr.org
Message-ID: <960311102706_443414478@mail02.mail.aol.com>
Rendered body type: text/plain

I invite you to write a story about this for our readers. The next two
deadlines are March 20 and June 15.   QTH: -mail ATVQ2AOL.COM, or ATVQ, 3
N. Court St., Crown Point, IN 46307

56. Re: [SS:136] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Mon, 11 Mar 1996 10:29:50 -0500
To: ss@tapr.org
Message-ID: <960311102950_443416315@emout07.mail.aol.com>
Rendered body type: text/plain

OK, You are farther ahead, how about letting the video people know by
writing an article for us on the subject, maybe get more SS converts,
  ATVQ@AOL.COM or ATVQ, 3 N. Court St., Crown Point, IN 46307   73 Henry

57. Re: [SS:137] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Mon, 11 Mar 1996 10:32:38 -0500
To: ss@tapr.org
Message-ID: <960311103238_443418226@mail04.mail.aol.com>
Rendered body type: text/plain

well there is mor to hm than HF DX. I got over that many yearas ago, and
have been mostly tinkering on VHF-UHF and microwave.   73 Henry

58. Re: [SS:139] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Mon, 11 Mar 1996 10:36:02 -0500
To: ss@tapr.org
Message-ID: <960311103559_443420535@emout07.mail.aol.com>
Rendered body type: text/plain

12 db SINAD is good enough, but most FM rpts are aligators anyway.   73
 Henry

59. Re: [SS:134] Re: File your comments in RM-8737!

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 11 Mar 1996 12:10:17 -0500
To: ss@tapr.org
Message-ID: <1445e960@smtpgty.bwi.wec.com>
Rendered body type: text/plain

You make a good point, Henry. I think this attitude is pervasive through
America as well. I don't think the point is make a better cell phone,
although I'm sure some are trying. The point is to have some personal
satification in building it yourself. At least it is with me. Why would
someone want to fix his own car? A mechanic has all the tools and experience,
so why do it yourself. Becasue you want to!

I disagree that hams cannot do as good or better job than what is on the
market. With the right knowledge, you can build just about most anything. It
may take more parts and an increase in input current, etc, but at least YOU
built it, not some assembly line worker.

Hams have had a long history of tinkering and some have even made important
discoveries. Lets not forget about that.

Tony, KE4ATO
lanier.r.a@nort.bwi.wec.com
_____ Reply Separator _____
Subject: [SS:134] Re: File your comments in RM-8737!
Author: ss@tapr.org at BALT.SMTP
Date: 3/9/96 10:24 AM

Yes that is the sorry state of ham radio. All appliance operators and no
tinkerers. The only tinkering is in Europe, and what SS folks a a very small
handfull of others are willing to do. It has gotten to expensive, most of us
have to work longer hours so we have less time to tinker and amuse our selves
with Rice Paddy specials from Kenwood Icom, Yaesu etc, from 160 to 1296.
Except for my 440, 900, 1200, 2400 MHz equipment, which is hand built,
everything else is out of the box. On the other hand, my video editing
equipment (over $40,000) does more than I could ever build because it has
chips I cannot buy, let alone design around.
Technology has made most home brewing efforts more effort than reward.
 Except for self satisfaction there is little you can build that cant be
bought for less or does much more for a lot less.   Try building your own
cell phone and make it work as well as Motorola and make it smaller than
their flip phone. Go ahead....
Get the point?
hats off to those who sweat over the soldering iron. But there are darn few
left. Thats why Heathkit went out of business.   The world has changed by
the computer.
73 Henry

60. Re: [SS:140] Re: File your comments in RM-8737!

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 11 Mar 1996 12:36:45 -0500
To: ss@tapr.org
Message-ID: <14464fb0@smtpgty.bwi.wec.com>
Rendered body type: text/plain

>The issue of SS with weak-signal can be approached by not putting SS
>sideband energy into weak-signal subbands when people are trying to work
>weak-signal. (We'll ignore for the moment how SS may actually help
>weak-signal guys.)

I'd like to know how SS can help weak-signal guys. I have an idea, but I
want to hear yours.

>This has always been handled by "Gentleman's Agreement". We have places on
>our bands for various mutually exclusive modes.

>Remember when that "packet racket" first burned up 145.01 around the country?
>And then started expanding to more and more FM simplex frequencies? What
>happened was existing modes accommodated packet into their bandplans.

Good point! Its funny how packet, QRP, DXing, etc all thrive together.

>The other thing I'm noticing in this discussion is that we seem to be
>attacking each other. When it comes to frequencies, "United we stand,
>divided we fall!"

>I also enjoy wideband ATV, with its high fidelity video, and I also like
>computer video. I'm eager to watch AHDTV video transmitted in a 6 MHz
>channel. I like VHF/UHF weak-signal, packet, and - gosh! - SS.

>I think it would be best for us all if we worked together so that everybody
>can enjoy the hobby to the fullest. This I think means accommodating all
>modes.

Amen to that! One interesting thing about SS is that it will not *directly*
interfere with other users, although weak-signal guys might see a little.

>I would also like to point out that SS is - right now! - legal on the ham
>bands. What the ARRL petition is asking, among other things, is allowing
>other spreading codes.

>SS is here to stay!

>-Mike K3MC

61. RM-8737 Comments Posted to WWW.TAPR.ORG

From: "Steven R. Bible" <srbible@mindport.net>
Date: Mon, 11 Mar 1996 12:34:53 -0500
To: ss@tapr.org, netsig@tapr.org, tcp-group@ucsd.edu, amsat-bb@amsat.org
Message-ID: <1.5.4b11.32.19960311173453.00692140@mindport.net>
Rendered body type: text/plain

Comments and reply comments to RM-8737, Ammendment of Part 97 of the
Commission's Rules Governing the Amateur Radio Service to Facilitate Spread
Spectrum Communications are being posted to

   http://www.tapr.org/ss/rule_changes.html

TAPR will endeavor to keep the page current.

The following comments are presently posted:

     Robert A. Buaas, K6KGS 2/23/96
     Southern California Repeater and Remote Base
         Association (SCRRBA), 2/23/96
     TAPR Comments 2/26/96
     National Communications System, 2/26/96
     George Isely, WD9GIG, President, Mid-America Coordination
         Council, Inc., 2/26/96
     Whit Brown, WB0CJX, Frequency Coordination Chairman,
         Mid-America Coordination Council, Inc., 2/26/96
     The Indiana Repeater Council, 2/28/96
     Henry Ruh, KB9FO, Publisher, Amateur Television Quarterly, 2/28/96
     Charles M. Albert, Jr. KC6UFM, 3/4/96
     Mike Cheponis, K3MC 3/4/96

Reply Comments from:

Mike Cheponis, K3MC 3/6/96
Bill Tynan, W3XO 3/11/96

Comments from the following will be posted as time permits:

Nels Harvey, WA9JOB, 2/20/96
The San Bernardino Microwave Society, 2/20/96
SouthEastern Repeater Association, Inc., 2/23/96
John Mock, KD6PAG, 2/27/96

- Steve, N7HPR

srbible@mindport.net
n7hpr@amsat.org
n7hpr@tapr.org

62. Re: Hopelessly defeatest?

From: Robert.Glassey@nmp.nokia.com
Date: Mon, 11 Mar 96 17:58:37 +0000
To: ss@tapr.org
Message-ID: <H00002920149265b@MHS>
Rendered body type: text/plain

Tony, KE4ATO (lanier.r.a@nort.bwi.wec.com) writes:

>If all of this is true, then why has the military been so successful
>in implementing SS? If it truely did cause the interference as stated
>here, why would SS be used for satellite communications for deep-space
>probes (at least that is what I was told) ??

There are a number of reasons. Systems like GPS have MASSIVE processing gains, and cellular systems operate in a well controlled and structured enviroment. Never heard of SS being used for space probes, PSK is the norm there as far as I know, but again with lots of bandwidth and potentialy massive processing gains the situation is quite different. Also high gain antennas reduce terestial noise floor problems etc etc. Other systems (900MHz) only transmit over a few hundred meters making them more tolerant since the SS TX is closer than anything else, with very low power.

These are all luxuries we dont have as amateurs.... at least below 1 GHz, but I think things may be different in the microwave bands. Looking at the UK allocations, there is a band around 3.5GHz what would be ideal. These days 3.5GHz, especially at only a few mW, is easier than 70cm was 10 years ago, even more so with a wideband mode. DSSS would be quite nice up there, for everyone. You'd want a dish though, but there's heaps of cheap satilite TV surplus stuff arround, same goes for HEMT's etc etc. Same goes for cellular. Microwave bands are in the consumer domain now. With spinoffs for hams, ie lots of cheap surplus devices.

>There is a flaw in the agruement here. If SS operates in the noise
>floor of a typical CW/SSB transceiver, how is this going to cause

Unfortunatly it doesn't. Maybe if we could spread to 100MHz or 1GHz things would be different, or if we would put up with 1200 baud. But this is not the case.

>interference to a neighbooring repeater or other operator? This point
>was not specificly brought out in the discussion below. I strongly
>disagree that a SS system with 10mW output would cause *significant*
>interference as to render anything but a repeater useless is absurd!
>10mW is very little power! We need to educate the public as to EXACTLY
>what SS is, what it does, and how will (will not) affect other users
>of the frequency spectrum.

Unfortunatly the numbers speak for themselves. 10mW is the figure I used, and showed that there was significant interference. There seems to be some agreement on this one. Narrow band modes and Direct sequence SS apparanetly cannot coexist, at least on the VHF/UHF amateur bands.

If this is not the case, what's wrong with my numbers? I though they were very conservative, only one 1W narrowband user 20km away! And SS with good FEC. Sure the processing gain isn't much, but thats what were stuck with on the low bands. Put simply, if the SS station is 10mW, and another user, narrow or wideband, is 1W then the 1W user represents 100

SS stations at the same distance. Its purely a capacity problem, the classic near-far/power control problem. While there are techniques for getting around this, they assumes all users in the band abide by the same rules, namely power control. It also requires everyone to talk to the nearest base station, it excludes DX specifically, not even to the next base station! DSSS is a highly cooperative mode, where anyone can unwittingly ruin it.

My concern is not so much what SS will do to narrow band guys, I think we can be a bit more selective about what frequencies we use, but more what THEY CAN DO TO SS. We must get away from them for SS to work properly. We cannot (and shouldn't try to) exersize enough control over narrow band modes to make the two compatible.

The only hope for DSSS (which seems by far the simplest) is to go for microwave bands. Which I reckon is easier than it might at first appear to be. Up there we have little competition, massive band widths, and a level playing feild (even narrow band modes/ATV etc use mW of power and dishes. We might even get an 'exclusive'! (SS allocation)

Has anyone done a 3.5GHz (or whatever) upconverter/downconverter kit?

Cheers,

Rob, G0VTQ

63. [SS:120] Re: Hopelessly defeatest?

From: Robert.Glassey@nmp.nokia.com
Date: Mon, 11 Mar 96 18:12:33 +0000
To: ss@tapr.org
Message-ID: <H000029201497515@MHS>
Rendered body type: text/plain

>Nobody on this SIG seems to have mentioned FEC in any of this. Are we
>ignoring this or simply assuming it is a waste of time?

>Surely if one is using a reasonably robust FEC system (such as the
>sequential decoding system proposed by Phil on his web site) using any
>SS system, then the presence of the NB signal isn't going to have that
>much effect. You also have the advantage of the coding gain given by
>the FEC system itself.

>Apart from Phil KA9Q, I have yet to meet amateurs who are truely
>convinced of the merits of FEC / HAMMING / VITERBI / whoever codes for

I am 100% convinced of the advantages of FEC. Buts it gets a little tricky to fully understand so its tough to talk inteligently about the posibilities here.

Of course, FEC isn't magic, it only allows you to get closer to the shannon limit. It cannot provide enough gain to overcome the problems of DSSS I mentioned in my original post, (which actaully assumes good FEC).

DSSS problems aside, how about this?

FEC-SS

One way of thinking of DSSS is that it reduces interference by applying a sort of convolutional code to the data with massive redundancy then using simple multplication and averaging to perform crude error correcting decoding.

Can we get smart here?

Can we combine high performance FEC with spreading? Say a rate 9/10? code (9 redundent bits in every 10, is this rate 9/10?) This would also be a type of spread spectrum. We could have multiple users, all with different convolutional codes, all on the same channel. Is this possible? I suspect the decoding gets very tricky but some combination of averaging and trellis coding may give good performance. Would this be better than just applying FEC after despreading? Perhaps despread to twice your data rate then error-correct to get the original data rate. Much better than just despreading back to the original data rate I would have thought. How far can we go? It seems the extra bandwidth for extra FEC bits comes free with spread spectrum.

OFDM-SS

Can we go on from this and combine this with multi carrier techniques, so that we can control where our energy goes, and thus interference both to and from narrow band systems. OFDM techniques like Clover II bears some similarities to frequency hopping systems. High speed, wideband (Digital TV) OFDM systems exist. Can we apply massive redundancy FEC systems to this to create a multi access spread spectrum system with near shannon limit performance, while at the same time ovioding narrow band user problems? How many square inches of silicon would be required? Apparently there are a number of cunning tricks that make this technique practical, at least for TV, and combining it with high redundancy may relax the hardware/software requirements even more. There might be a phD in this for someone?

Perhaps this is getting a little complex for amateur use.

Anyway, just a few more ideas.

Rob, G0VTQ

64. Re: [SS:149] Re: Hopelessly defeatest?

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 11 Mar 96 13:40:47 UTC
To: ss@tapr.org
Message-ID: <9502@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Rob,

Your comments are very thought provoking!

I m not sure if this is what u said, or what occured to me, when u said what u said.

Impulse noise on UHF/VHF data is a big problem. How does SS effect this?

My understanding is a bit shakey, here, but here goes. The Impulse occurs over the whole BW. It takes out one DSSS chip bit. So, that represents an impulse in the despread output, right? So, DSSS does not cure Impulse noise.

FEC does cure Impulse noise effects. An isolated bit error , or 2 or 3 seperated isolated bit errors can be corrected with the proper FEC.

How about making the spreading code FEC? Instead of FEC that s twice as many bits, or whatever, make it 10 or 20 redundant bits for each data bit!? That way, we spread, and FEC in the same process! It solves Impulse noise, say on 6 meters, but it also solves multipath, say like on 1.2 Ghz, or around airports.

Is this really practical now? Can FEC be decoded at Chip rates? Maybe this technigue would be good for HF? As with a multitone modem. And for low baseband data rates (voice) spread over a few hundred Kilohertz?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org%hydra-gw.carleton.ca

65. Re: [SS:149] Re: Hopelessly defeatest?

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 11 Mar 1996 14:56:46 -0500
To: ss@tapr.org
Message-ID: <144a7bc0@smtpgty.bwi.wec.com>
Rendered body type: text/plain

In any high speed link, error correction invaribly pops up. Unless you have a perfect system and I don't know of one yet. This is a complicated science, if it is done well. A simple start bit/stop bit is OK, but real error correction goes way beyond this.

No, I don't think this subject is too complicated for amateur use! We have a perfect medium in which to experiment these types of ideas. I think there isn't enough interest in this area. Am I wrong in assuming that the majority of hams just want to ragchew and not experiment?

Tony

_____ Reply Separator _____
Subject: [SS:149] Re: Hopelessly defeatest?
Author: ss@tapr.org at BALT.SMTP
Date: 3/11/96 12:34 PM

>Nobody on this SIG seems to have mentioned FEC in any of this. Are we =

>ignoring this or simply assuming it is a waste of time? =

>Surely if one is using a reasonably robust FEC system (such as the =

>sequential decoding system proposed by Phil on his web site) using any
>SS system, then the presence of the NB signal isn't going to have that =
=

>much effect. You also have the advantage of the coding gain given by
>the FEC system itself.

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Of course, FEC isn't magic, it only allows you to get closer to the
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DSSS I mentioned in my original post, (which actaully assumes good FEC).=

DSSS problems aside, how about this?

FEC-SS

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a sort of convolutional code to the data with massive redundancy then
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correcting decoding.

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different convolutional codes, all on the same channel. Is this
possible? I suspect the decoding gets very tricky but some combination
of averaging and trellis coding may give good performance. Would this be=

better than just applying FEC after despreading? Perhaps despread to
twice your data rate then error-correct to get the original data rate.
Much better than just despreading back to the original data rate I would=

have thought. How far can we go? It seems the extra bandwidth for extra
FEC bits comes free with spread spectrum.

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Can we go on from this and combine this with multi carrier techniques,
so that we can control where our energy goes, and thus interference both=

to and from narrow band systems. OFDM techniques like Clover II bears
some similarities to frequency hopping systems. High speed, wideband
(Digital TV) OFDM systems exist. Can we apply massive redundancy FEC
systems to this to create a multi access spread spectrum system with near
shannon limit performance, while at the same time ovioding narrow band
user problems? How many square inches of silicon would be required?=

Apparently there are a number of cunning tricks that make this technique=

practical, at least for TV, and combining it with high redundancy may
relax the hardware/software requirements even more. There might be a phD=

in this for someone?

Perhaps this is getting a little complex for amateur use.

Anyway, just a few more ideas.

Rob, G0VTQ

66. Re: [SS:141] Re: Digital video

From: Ignacio Huerta <ignacio@ix.netcom.com>
Date: Mon, 11 Mar 1996 20:23:57 -0800
To: ss@tapr.org
Message-ID: <199603120423.UAA26279@ix.ix.netcom.com>
Rendered body type: text/plain

Do you publish an ATV journal? I'm looking for any ham efforts related to digital video. Any information you could provide would be greatly appreciated.

Tnx es 73 de Ignacio AC6NY

At 09:45 AM 3/11/96 -0600, you wrote:
>I invite you to write a story about this for our readers. The next two
>deadlines are March 20 and June 15.   QTH: -mail ATVQ2AOL.COM, or ATVQ, 3
>N. Court St., Crown Point, IN 46307
>
>
>

67. Subscribre

From: Per-Tore <c-three@telepost.no>
Date: Tue, 12 Mar 1996 11:14:05 +0100
To: ss@tapr.org
Message-ID: <199603121014.12568.telepost.no@telepost.no>
Rendered body type: text/plain

SUBSCRIBE

Please add me to your mailing list.

Regards
Per-Tore
LA7NO

Per-Tore Aasestrand	E-mail : c-three@telepost.no
C-Three Systems AS	Fax : + 47 - 55 23 18 88
P.O. Box 1708	Voice : + 47 - 55 32 67 67
N-5024 Bergen, Norway	Mobile : + 47 - 92 04 44 76

68. Re: [SS:148] Re: Hopelessly defeatest?

From: ATVQ@aol.com
Date: Tue, 12 Mar 1996 11:58:17 -0500
To: ss@tapr.org
Message-ID: <960312115816_244109838@emout04.mail.aol.com>
Rendered body type: text/plain

3.5 ghz is not that diffidult. You can "turn around" a TVRO LNB so rather than converting to 900-1300, from 3.6-4.2 GHz, you inject at 900-1300 and come out at 3.5 Ghz (pick your frequency and LO to get where you want). A TVRO dish will offer a lot of gain, but is a wind load. A simple Yagi has enough gain (up to 20 dBi) and is very small at this frequency. It was published in the Central States VHF conference notes several years ago. A lot of us microwave banders use the 2 foot "snow coaster" as a parabolic reflector with the perverbial Campbell's Soup can probe at the focal. This has been published everywhere many times. There are also some European commercial 3.5 Ghz units that workin the US 3.5 and 5.5 Ghz ham bands. he easiet route is the reverse LNB process since you get gain enough to drive it with a direct synthesis chip or PLL in a reasonably stable 1.2 GHz frequency (doubles as a 1.2 Ghz ttransmitter too!) and will give up to 30 dB power gain (up to 27 dBm) more than enough to splattter on the dish (another 20 dB) or feed tothe yagi dipole (also 20 dB) or go all out with a 10 foot Winegard mesh TVRO dish for 36 dB gain! (about 42 dB on 5.5 GHz!) THis has worked on DX in SSB/FM mode on openings for 300 miles in the midwest, and up to 100 miles under normal band conditions.
73 Henry KB9FO.

69. Re: [SS:152] Re: Digital video

From: ATVQ@aol.com
Date: Tue, 12 Mar 1996 11:58:26 -0500
To: ss@tapr.org
Message-ID: <960312115825_244109946@mail02.mail.aol.com>
Rendered body type: text/plain

Yes, I publish ATVQ (Amateur Television Quarterly). There has been very little on digital TV. I am trying to get a translation of a German article now to republish. Looking for input! 73 Henry KB9FO

70. TAPR Reply Comments on RM-8737

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 12 Mar 1996 20:07:21 -0600 (CST)
To: tapr-bb@tapr.org (TAPR-BB mailing)
Cc: ss@tapr.org
Message-ID: <199603130207.UAA00168@tapr.org>
Rendered body type: text/plain

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
Amendment of Part 97 of the) RM-8737
Commissions Rules Governing)
the Amateur Radio Service to)
Facilitate Spread Spectrum)
Communications)

To: The Commission

REPLY COMMENTS OF TUCSON AMATEUR PACKET RADIO CORPORATION

The Tucson Amateur Packet Radio Corporation ("TAPR") submits the following reply comments regarding the Petition for Rulemaking (the "Petition") filed by the American Radio Relay League ("ARRL"), which proposed certain changes in the rules governing spread spectrum operation in the Amateur Radio Service ("ARS").

I. PERMITTING MORE WIDESPREAD SPREAD SPECTRUM OPERATION IN THE ARS WOULD SERVE THE PUBLIC INTEREST.

A number of the comments recognized the benefits that could be provided by more widespread use of spread spectrum technologies in the ARS (1). In addition to those that would accrue to ARS operators, as described in the Petition, increased use of spread spectrum in the ARS would contribute to the overall development of spread spectrum communications (2) and, as a result, would provide benefits indirectly to commercial users as well.

Expanded use of spread spectrum in the ARS also would further the Commission's objective of promoting efficient spectrum use. At the FCC's March 5, 1996 en banc hearing on spectrum policy, Paul Barens, the "father" of one of the technologies that forms the basis of the Internet, made the following statement:

> "What do we see today if we tune a spectrum analyzer or a radio receiver across most of the scarce spectrum bands? Mostly nothing. Dead air. This strongly suggests that most of our limited spectrum space is not being fully utilized and is going to waste. Specifically, with digital technology, spectrum bands can be more efficiently packed without interfering with existing services."

By increasing the ability of ARS operators to use spread spectrum technologies, the Commission would enhance their ability to use digital technologies to enhance spectrum efficiency, as recommended in the above passage. In turn, the Commission also would make it possible for the ARS better to accommodate the many new users seeking to use ARS bands, which are already congested due to the widespread use of non-digital equipment.

Although spread spectrum is not a panacea, it offers the promise of increased spectrum efficiency, reduced interference, and improved communication performance without adversely affecting other spectrum users. As a result, the Commission's rules governing spread spectrum operation

should be modified to enable these technologies to flourish within the amateur service community.

II. EXPANDED SPREAD SPECTRUM OPERATIONS WILL NOT ADVERSELY AFFECT OTHER ARS OPERATIONS.

Several repeater coordinating organizations, who are responsible for the coordination of repeater operations in their regional areas of activity, filed comments opposing to the Petition. These entities generally alleged that adoption of ARRL's proposals would cause widespread interference to, and disruption of, existing operations.

The fears and concerns expressed in these comments defy the proven ability of properly designed and implemented spread spectrum systems to operate in harmony with other spectrum users, are based upon "worst-case" scenarios, and reflect a desire to maintain the status quo even at the cost of stifling new technologies and services. As a result, they should not be permitted to prevent the development of spread spectrum in the ARS.

First, as discussed by Robert Buaas, claims that spread spectrum operation will raise the noise floor ignore the fact that few real systems operate near the noise floor, and those that do would profit from applying spread spectrum technology (3).

Second, in the ten years since the Commission first allowed limited spread spectrum operation in the ARS, a great deal of work has been done to address concerns that more flexible spread spectrum operation would adversely affect other types of ARS operations. In particular, the 1991 Buaas spread spectrum STA has made it possible for experimenters to engage in widespread use of spread spectrum technologies in the amateur band allocations below 450 MHz. Notably, operation under the existing spread spectrum rules and experimentation under the spread spectrum STA have not generated substantiated claims of objectionable interference (4).

Finally, the successful operation of Part 15 spread spectrum systems provide substantial evidence of the ability of these devices to co-exist with other users. Today, millions of spread spectrum devices operating under Section 15.247 of the Commission's rules are being used to support end-user solutions in areas such as cordless phones, location monitoring devices, and local and metropolitan-area networking. These devices have been deployed across the United States without any local coordination and without any licensing by the Commission. Yet despite this flexibility and extensive use, spread spectrum Part 15 devices have almost universally operated without causing objectionable interference to other Part 15 devices or to others operating in shared spectrum (5). This success story provides ample proof that when spread spectrum devices are properly designed, manufactured, and deployed, they can coexist successfully with many diverse applications and, in addition, can facilitate frequency reuse.

In light of this history of successful, non-interfering operation, the Commission should not permit unsubstantiated claims of potential interference to thwart the introduction and use of new spread spectrum technologies in the ARS (6).

III. SECTION 97.119(B)(5) OF THE RULES SHOULD BE DELETED, AS SUGGESTED BY NCS.

TAPR supports the suggestion made by the Manager of the National Communications System ("NCS") to delete Part 97.119 (b)(5), which deals with the requirement for CW identification. TAPR agrees that no currently available commercial equipment implements such a function, and that deletion of this requirement will act to speed the rapid adoption of this equipment into use in the ARS.

CONCLUSION

TAPR congratulates the ARRL for its forward-looking proposal to liberalize the spread spectrum rules in the ARS. ARRL's proposal, if adopted, could provide a variety of benefits to both members of the amateur service community and to the wider public.

Proposals to modify the status quo often generate opposition by those who are adequately served by it. Like the turmoil that occurred in the ARS during the transition from AM to SSB, the growing use of spread spectrum in the service will not be without incidents of disagreement and misunderstanding. For this reason, TAPR intends to use its resources during

the rulemaking process to educate the ARS community on the theory, application, and practice of spread spectrum technology.

Yet while fear and opposition are understandable, they should not be permitted to stifle new developments. In light of spread spectrum's strong track record and proven benefits, unsubstantiated claims of potential interference should be discounted and the Commission should act promptly to issue a Notice of Proposed Rulemaking proposing to implement the changes sought by ARRL, modified as discussed in TAPR's earlier comments.

Respectfully submitted,

THE TUCSON AMATEUR PACKET RADIO CORPORATION

By:
Dewayne Hendricks
Tucson Amateur Packet Radio Corporation
8987-309 E Tanque Verde Rd #337
Tucson, Arizona 85749-9399
(817) 383-0000

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(1) See, e.g., Comments of Robert A. Buaas (RBuaas CommentsS); Comments of the Manager of the National Communications System (RNCS CommentsS); Comments of John Mock; Comments of Henry B. Ruh; see also ARRL Petition.

(2) See NCS Comments at p. 3.

(3) Buaas Comments at p. 2.

(4) Buaas Comments at p. 3.

(5) See Comments of the Part 15 Coalition, PR Docket No. 93-61 (1995).

(6) TAPR believes that a program of continuing education to the ARS community on the merits and benefits of spread spectrum technology coupled with a wider use and deployment of equipment by amateurs in various applications will go a long way towards resolving the concerns of many of the commenters who have filed in opposition. TAPR intends to use its resources to perform this function and service for the amateur radio community in much the same fashion that it helped start the packet radio revolution in the ARS during the mid-1980Us.

71. Equipment report/ AMI

From: Jeff King <jeff@mich.com>
Date: Tue, 12 Mar 1996 23:33:22 -0500
To: ss@tapr.org
Message-ID: <1.5.4b11.32.19960313043322.00695da4@mich.com>
Rendered body type: text/plain

Was wondering who on this list is using SS for a internet link and/or a full time data link. I'm
using some FreeWave units here (I'm gw-aerodata.mich.com) to link to my ISP, who is about
1.7 miles from me. I have a yagi (9 element) at 30 feet and the ISP has a omni also at
about 30 feet. (I do demos in the area and also multipoint). I've had good luck with a
'rubber duck' to about a mile and in the vehicle (a cell antenna) to about 3-4 miles.
We are in the Detroit area and it is flat to hilly with heavy trees.

The FreeWave is a 115kbaud frequency hopping radio in the 902-928mhz band. Throughput using
a PPP link is about 8.2kbytes/sec on a FTP. I've also used corner reflectors and helical antennas
with the units as well. By and large, I'm fairly happy with the units.

Are there any other low cost units out there that are of interest to the experimenters? Anyone
using any of them?

On a (un?)related topic, has anyone any experince with the AMI S20043 direct

sequence spread
spectrum transciever IC? I've got some prerelease data sheets from a year
ago but haven't heard
anything else about it.

Best regards,

-Jeff King
 WB8WKA

72. RM-8737 on SS Issues Updated

From: Greg Jones <wd5ivd@tapr.org>
Date: Thu, 14 Mar 1996 02:11:57 -0600 (CST)
To: ss@tapr.org, tapr-bb@tapr.org (TAPR-BB mailing),
amsat-bb@amsat.org (AMSAT BB Mail Group)
Message-ID: <199603140811.CAA06013@tapr.org>
Rendered body type: text/plain

The web page on RM-8737 concerning SS Amateur Rule Changes has been updated.
Additional comments and reply comments will be added as time allows.

It contains the following as of March 13th, 1996:

The Initial Filing, assigned as RM-8737
ARRL Petition for Rulemaking, filed December 12th, 1995.

Comments to RM-8737
San Bernardino Microwave Society 2/20/96
Robert A. Buaas, K6KGS 2/23/96
Southern California Repeater and Remote Base Association
(SCRRBA), 2/23/96
SouthEastern Repeater Association, Inc 2/23/96
TAPR Comments 2/26/96
National Communications System, 2/26/96
George Isely, WD9GIG, President, MACC, 2/26/96
Whit Brown, WB0CJX, Frequency Coordination Chairman, MACC, 2/26/96
The Indiana Repeater Council, 2/28/96
Henry Ruh, KB9FO, Publisher, Amateur Television Quarterly, 2/28/96
Charles M. Albert, Jr. KC6UFM, 3/4/96
Mike Cheponis, K3MC 3/4/96

Reply Comments to RM-8737
Mike Cheponis, K3MC 3/6/96
Bill Tynan, W3XO 3/11/96
AMSAT 3/11/96
TAPR 3/11/96
Phil Karn 3/11/96
Robert A. Buaas, K6KGS 3/11/96
Steven Bible, N7HPR 3/11/96
Naval Postgraduate School 3/11/96
Charles M. (Marty) Albert, Jr. KC6UFM 3/13/96

To review these, you can check http://www.tapr.org/ss

73. RM-8737 Update

From: Greg Jones <wd5ivd@tapr.org>
Date: Sun, 17 Mar 1996 19:49:01 -0600 (CST)
To: ss@tapr.org, regional_freq@tapr.org
Message-ID: <199603180149.TAA26205@tapr.org>
Rendered body type: text/plain

The web page on RM-8737 concerning SS Amateur Rule Changes has been updated.
Additional comments and reply comments will be added as time allows.

It contains the following as of March 17th, 1996:

The Initial Filing, assigned as RM-8737	Date Added
ARRL Petition for Rulemaking, filed December 12th, 1995.	3/4/96
Comments to RM-8737	
Nels Harvey, WA9JOB 2/20/96	3/17/96
San Bernardino Microwave Society 2/20/96	3/13/96
Robert A. Buaas, K6KGS 2/23/96	3/3/96
Southern California Repeater and Remote Base Association (SCRRBA), 2/23/96	3/11/96
SouthEastern Repeater Association, Inc 2/23/96	3/13/96
TAPR Comments 2/26/96	2/27/96
National Communications System, 2/26/96	3/4/96

George Isely, WD9GIG, President, MACC, 2/26/96 3/11/96
Whit Brown, WB0CJX, Frequency Coordination Chairman, MACC, 2/26/96 3/11/96
John Mock KD6PAG 2/27/96 3/17/96
The Indiana Repeater Council, 2/28/96 3/11/96
Henry Ruh, KB9FO, Publisher, Amateur Television Quarterly, 2/28/96 3/11/96
Charles M. Albert, Jr. KC6UFM, 3/4/96 3/3/96
Mike Cheponis, K3MC 3/4/96 3/6/96

Reply Comments to RM-8737
Mike Cheponis, K3MC 3/6/96 3/6/96
Bill Tynan, W3XO 3/11/96 3/11/96
AMSAT 3/11/96 3/12/96
TAPR 3/11/96 3/12/96
Phil Karn 3/11/96 3/11/96
Robert A. Buaas, K6KGS 3/11/96 3/13/96
Steven Bible, N7HPR 3/11/96 3/13/96
Naval Postgraduate School 3/11/96 3/13/96
National Communications System, 3/11/96 3/17/96
Charles M. (Marty) Albert, Jr. KC6UFM 3/13/96 3/14/96

To review these, you can check http://www.tapr.org/ss

74. LEAGUE RESPONDS TO COMMENTS IN SPREAD SPECTRUM PETITION

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Fri, 22 Mar 1996 10:21:48 -0800
To: ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140b05ad789fe7b04e@[204.118.182.22]>
Rendered body type: text/plain

LEAGUE RESPONDS TO COMMENTS IN SPREAD SPECTRUM PETITION

The ARRL says its petition to relax spread spectrum rules seeks to address a lack of SS experimentation by hams, not too much spread spectrum. Responding to comments filed in response to its December rule making petition, RM-8737, the League emphasized that Amateur Radio--as an experimental service--requires flexible rules and "some trust of the licensees carrying out experiments."

Noting that some commenters called for tighter rules on SS, the League sought to dispel fears that relaxing the rules on spread spectrum would lead to an increase in the noise floor in bands used by narrowband modes. The League said most opposing commenters "ignore the fact that some amateur bands already are occupied by Part 15 spread spectrum devices," many near ham stations. Additional constraints would hinder hams from keeping up with spread spectrum developments and prevent maximizing spectrum efficiency, the League's filing asserted. The ARRL said its petition "suggests only a modest deregulatory effort."

The League's Petition for Rule Making seeks relaxed restrictions on spreading sequences and greater flexibility in spreading modulation. The spread spectrum technique, which distributes information among several synchronized frequencies within a band at the transmitter and reassembles the information at the receiver, was first approved for Amateur Radio in 1985 for bands above 225 MHz, and there has been some experimental amateur operation since then.

The petition proposes that the FCC permit brief spread-spectrum test transmissions and allow international spread-spectrum communication between amateurs in the US and those in countries that permit hams to use spread-spectrum techniques. The current rules allow only domestic communication. The petition also asks for automatic power-control provisions to insure use of minimum necessary power to conduct spread-spectrum communication and limit the potential for interference to narrowband modes. The petition does not ask for any changes in frequency restrictions on SS emissions, the 100-W power limit or logging and identification requirements. The League calls the proposals "the minimum necessary changes in order to foster SS experimentation in the Amateur Service."

Those filing comments supportive of spread spectrum included the Tucson Amateur Packet Radio Corporation (TAPR); Robert A. Buaas, K6KGS, and John Mock, KD6PAG. Commenting in opposition were the Indiana Repeater Council; Henry B. Ruh, KB9FO; the Wisconsin Association of Repeaters; the Mid-America Coordination Council Inc; the Southern California Repeater and Remote Base Association; the San Bernardino Microwave Society and the Southeastern Repeater Association Inc.

75. Re: [SS:160] LEAGUE RESPONDS TO COMMENTS IN SPREAD SPECTRUM PETITION

From: ATVQ@aol.com
Date: Sat, 23 Mar 1996 22:36:28 -0500
To: ss@tapr.org
Message-ID: <960323223626_453342741@emout04.mail.aol.com>
Rendered body type: text/plain

Kindly note that the comments I filed were in SUPPORT of more SS, but were not in support of specific areas of the ARRL petition. I have been, and continue to be in support of experimentation and new technologies and the use of other than FM VHF and SSB HF operations. Our main concern, which is shared by the Indiana repeater council, has been the interference potential to existing band users from inadvertant use of frequencies where other modes exist. With planning we can all share the bands and have fun. SS has certainly earned a place and we welcome the technical efforts and good will generated by the SS community. I am also infavor of SS having access to the packet only 219-220 band where it would work nicely, and in favor of unrestricted communications with non domestic stations and in expanding the number of spreading code schemes.

We also need to encourage operations on the vacant 220, 900 and 1240 mhz bands and SS operations there would be ideal. I would also like to see a lot more SS on 6 meters where some exciting digital DX could be had.

The league has never formulated, and now it would disrupt most operations if they tried, a cohesive uniform VHF-UHF band plan. Their lack of leadership has been filled by local plans, many of which bear little resemblance from area to area. Each mode has simply moved to the vacant spot on the band at the time it emerged or grew to a critical mass. It wuld be nice to be able to plan the inclusion of SS in the bands in such a way as to make sure SS can exist and grow effectivly. There is likely so little general knowledge about SS that even if there is QRM, few would be likely to know that is what they see. As for part 15 devices, there are so few hams on 900 MHz that the chances of intercept are nil. You could operate with a KW in SS on 900 and likely not get noticed except for the vehicle locating people.

I hope that clears up our position.

73

Henry Ruh, KB9FO, Amateur Television Magazine

76. FCC APPROVES REALLOCATION PLAN FOR 185 MHz OF SPECTRUM

From: dewayne@warpspeed.com (Dewayne Hendricks)
Date: Fri, 29 Mar 1996 08:34:29 -0800
To: pcs@tapr.org (TAPR PCS Mailing List), ss@tapr.org (TAPR SS Mailing List)
Message-ID: <v02140b0aad81c1701e3b@[204.118.182.22]>
Rendered body type: text/plain

FCC APPROVES REALLOCATION PLAN FOR 185 MHz OF SPECTRUM

The FCC has approved a plan to reallocate 185 MHz of spectrum transferred from the Federal Government to the private sector. The Commission also established the scope and timing of future rule-making proceedings to assign the reallocated spectrum. Last March, the Secretary of Commerce identified 235 MHz of Federal Government spectrum for private-sector use, 50 MHz of which had been released earlier. The FCC allocated that spectrum space to general, commercial fixed and mobile uses and unlicensed services. The remaining 185 MHz is to be allocated and assigned gradually over a 10-year period, and a significant portion will be held "in reserve" until that period ends.

The Commission says it intends to "consider all options for the appropriate use of the remaining 185 MHz, including, but not limited to, those addressed in allocating the first 50 MHz." Among the services that will be considered is public safety. The Budget Act requires that the FCC study public safety spectrum needs and develop a plan to ensure adequate spectrum through the year 2010. The Public Safety Wireless Advisory Committee--chartered by the FCC and the NTIA--will advise later this year on the operational, technical and spectrum requirements of Federal, state and local public safety entities.--FCC

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Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AppleLink: D6547
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! AOL: HENDRICKS
Fax: (510) 770-9854 ! WWW: <http://www.warpspeed.com/>
~~~~~~

April 1996

Original source file: ss.9604
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9604

1. Re: [SS:162] FCC APPROVES REALLOCATION PLAN FOR 185 MHz OF S

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 1 Apr 1996 08:49:31 -0500
To: ss@tapr.org
Message-ID: <15FDEF60.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

What does this mean for SS useage??

Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:162] FCC APPROVES REALLOCATION PLAN FOR 185 MHz OF SPECT
Author: ss@tapr.org at BALT.SMTP
Date: 3/29/96 10:50 AM

FCC APPROVES REALLOCATION PLAN FOR 185 MHz OF SPECTRUM

The FCC has approved a plan to reallocate 185 MHz of spectrum transferred from the Federal Government to the private sector. The Commission also established the scope and timing of future rule-making proceedings to assign the reallocated spectrum. Last March, the Secretary of Commerce identified 235 MHz of Federal Government spectrum for private-sector use, 50 MHz of which had been released earlier. The FCC allocated that spectrum space to general, commercial fixed and mobile uses and unlicensed services. The remaining 185 MHz is to be allocated and assigned gradually over a 10-year period, and a significant portion will be held "in reserve" until that period ends.

The Commission says it intends to "consider all options for the appropriate use of the remaining 185 MHz, including, but not limited to, those addressed in allocating the first 50 MHz." Among the services that will be considered is public safety. The Budget Act requires that the FCC study public safety spectrum needs and develop a plan to ensure adequate spectrum through the year 2010. The Public Safety Wireless Advisory Committee--chartered by the FCC and the NTIA--will advise later this year on the operational, technical and spectrum requirements of Federal, state and local public safety entities.--FCC

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Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AppleLink: D6547
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! AOL: HENDRICKS
Fax: (510) 770-9854 ! WWW: <http://www.warpspeed.com/>
~~~~~~

2. League's Comments on SS on Newsline #973

From: "Steven R. Bible" <srbible@mindport.net>
Date: Mon, 08 Apr 1996 10:58:53 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960408145853.00695590@mindport.net>
Rendered body type: text/plain

Amateur Radio Newsline April 5th, #973 contains the League's comments on the comments filed on RM-8737, changes to SS rules. You can listen to Newsline from the TAPR web site using RealAudio from the page:

http://www.tapr.org/newsline/index.html

or you may find the text transcript to read.

Give it a listen...

73,

- Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

3. PN sequencer

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Tue, 9 Apr 1996 15:18:47 -0400
To: ss@tapr.org
Message-ID: <16AC5500.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Since little traffic has been moving lately, I thought I would pose a question:

When a shift register is used to produce a PN sequence, why is the output of the sequencer inverted? I am specifically refering to the use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7, and THEN inverting the result, which then becomes the output of the "system." There was a discussion of this in October 1986 QEX (if anyone has this issue, I would appreciate a copy of the article) and also in the ARRL SS Sourcebook.

From looking at other literature on the subject, I can find no mention of the inverter. Was the inverter added as a result of the system it was being used in? I would like to start experimenting with other PN sequences, but this issue needs to be resolved first!

73s de
Tony, KE4ATO

4. Re: [SS:165] PN sequencer

From: Julian Fields <jfields@cisco.com>
Date: Tue, 9 Apr 1996 15:03:59 -0700
To: ss@tapr.org
Message-ID: <199604092203.PAA20750@harrier.cisco.com>
Rendered body type: text/plain

> When a shift register is used to produce a PN sequence, why is the
> output of the sequencer inverted? I am specifically refering to the
> use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,
> and THEN inverting the result, which then becomes the output of the
> "system."

Not claiming to be an expert, but a PN
sequence inverted is still a PN sequence. So long as both the
transmitter and receiver have this inverter, it should work.

So, it will work with or without the inverter.
Good luck,
Julian Fields

5. Re: [SS:166] Re: PN sequencer

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 10 Apr 1996 08:45:50 -0400
To: ss@tapr.org
Message-ID: <16BADCB0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Julian,

I realize that the sequencer will work without the inverter, but why is is there in the first place? Its really not a big deal; I could add one later if needed.

Does anyone have access to the QEX article? It is the October 1986 issue. Just curious.

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:166] Re: PN sequencer
Author: ss@tapr.org at BALT.SMTP
Date: 4/9/96 5:52 PM

> When a shift register is used to produce a PN sequence, why is the
> output of the sequencer inverted? I am specifically refering to the
> use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,
> and THEN inverting the result, which then becomes the output of the

>   "system."

Not claiming to be an expert, but a PN
sequence inverted is still a PN sequence. So long as both the
transmitter and receiver have this inverter, it should work.

So, it will work with or without the inverter.
Good luck,
Julian Fields

6. Re: [SS:167] Re: PN sequencer

From: Julian Fields <jfields@cisco.com>
Date: Wed, 10 Apr 1996 12:56:04 -0700
To: ss@tapr.org
Message-ID: <199604101956.MAA27542@harrier.cisco.com>
Rendered body type: text/plain

It is probably as you suggest (for fanout or gate
loading requirements).   This brings to mind that
you could get 2 pseudo-random sequences from
one set of logic without changing taps-- just
invert the output. This would get you 2 CMDA
channels for the price of one inverter.
Maybe somebody at Qualcom can shed more light on
your question though.
Regards,
Julian

>
>   Julian,
>
>   I realize that the sequencer will work without the inverter, but why
>   is is there in the first place? Its really not a big deal; I could add
>   one later if needed.
>
>   Does anyone have access to the QEX article? It is the October 1986
>   issue. Just curious.
>
>   73s de
>   Tony, KE4ATO
>
>
> _____________________________ Reply Separator _____________________________
> Subject: [SS:166] Re: PN sequencer
> Author: ss@tapr.org at BALT.SMTP
> Date: 4/9/96 5:52 PM
>
>
>
> >   When a shift register is used to produce a PN sequence, why is the
> >   output of the sequencer inverted? I am specifically refering to the
> >   use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,
> >   and THEN inverting the result, which then becomes the output of the
> >   "system."
>
> Not claiming to be an expert, but a PN
> sequence inverted is still a PN sequence. So long as both the
> transmitter and receiver have this inverter, it should work.
>
> So, it will work with or without the inverter.
> Good luck,
> Julian Fields
>
>
>

7. Re: [SS:167] Re: PN sequencer

From: Per-Tore Aasestrand <c-three@telepost.no>
Date: Wed, 10 Apr 1996 22:53:14 +0200
To: ss@tapr.org
Message-ID: <199604102053.22144.telepost.no@telepost.no>
Rendered body type: text/plain

At 08:03 10.04.96 -0500, you wrote:
>   Julian,
>
>   I realize that the sequencer will work without the inverter, but why
>   is is there in the first place? Its really not a big deal; I could add
>   one later if needed.

>
>   Does anyone have access to the QEX article? It is the October 1986
>   issue. Just curious.

Maybe just in order to increase the drive, or to buffer the signal?
Just an idea!

Regards,

Per-Tore
LA7NO

----------------------------------+--------------------------------
Per-Tore Aasestrand	E-mail : c-three@telepost.no
C-Three Systems AS	Fax : + 47 - 55 23 18 88
P.O. Box 1708	Voice : + 47 - 55 32 67 67
N-5024 Bergen, Norway	Mobile : + 47 - 92 04 44 76
----------------------------------+--------------------------------

8. Re: [SS:168] Re: PN sequencer

From: Per-Tore Aasestrand <c-three@telepost.no>
Date: Wed, 10 Apr 1996 22:57:28 +0200
To: ss@tapr.org
Message-ID: <199604102057.22663.telepost.no@telepost.no>
Rendered body type: text/plain

At 15:10 10.04.96 -0500, you wrote:
>It is probably as you suggest (for fanout or gate
>loading requirements).   This brings to mind that
>you could get 2 pseudo-random sequences from
>one set of logic without changing taps-- just
>invert the output. This would get you 2 CMDA
>channels for the price of one inverter.

But this will not necessarily be two sequences that are suitable for
simultaneous CDMA. The code sequences should be mutually orthogonal, I believe!

Regards,

Per-Tore
LA7NO

----------------------------------+--------------------------------
Per-Tore Aasestrand	E-mail : c-three@telepost.no
C-Three Systems AS	Fax : + 47 - 55 23 18 88
P.O. Box 1708	Voice : + 47 - 55 32 67 67
N-5024 Bergen, Norway	Mobile : + 47 - 92 04 44 76
----------------------------------+--------------------------------

9. Re: [SS:167] Re: PN sequencer

From: Clifford Buttschardt <cbuttsch@slonet.org>
Date: Wed, 10 Apr 1996 14:48:55 -0700 (PDT)
To: "LANIER.R.A-" <LANIER.R.A-@smtpgty.bwi.wec.com>
Cc: ss@tapr.org
Message-ID: <Pine.OSF.3.91.960410144645.27319D-100000@biggulp.callamer.com>
Rendered body type: text/plain

Hi Julian and Tony. If you guys are in a bind for QEX articles, I
suspect I have every one ever published. They are buried in the attic,
however and might take some time to find! Cliff Buttschardt   W6HDO

On Wed, 10 Apr 1996, LANIER.R.A- wrote:

>   Julian,
>
>   I realize that the sequencer will work without the inverter, but why
>   is is there in the first place? Its really not a big deal; I could add
>   one later if needed.
>
>   Does anyone have access to the QEX article? It is the October 1986
>   issue. Just curious.
>
>   73s de
>   Tony, KE4ATO
>
>
> _________________________ Reply Separator _____________________________
> Subject: [SS:166] Re: PN sequencer
> Author: ss@tapr.org at BALT.SMTP

> Date: 4/9/96 5:52 PM
>
>
>
> >   When a shift register is used to produce a PN sequence, why is the
> >   output of the sequencer inverted? I am specifically refering to the
> >   use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,
> >   and THEN inverting the result, which then becomes the output of the
> >   "system."
>
> Not claiming to be an expert, but a PN
> sequence inverted is still a PN sequence. So long as both the
> transmitter and receiver have this inverter, it should work.
>
> So, it will work with or without the inverter.
> Good luck,
> Julian Fields
>
>
>

10. Re: [SS:168] Re: PN sequencer

From: Julian Fields <jfields@cisco.com>
Date: Wed, 10 Apr 1996 17:58:33 -0700
To: ss@tapr.org
Cc: bad@wireless.wdc.net
Message-ID: <199604110058.RAA04887@harrier.cisco.com>
Rendered body type: text/plain

Yes, this could be.
By orthogonal, you mean little correlation?
Is there a general theorem or do you have
to look at each PN code on a case by case basis?

Regards,
Julian

> On Wed, 10 Apr 1996, Julian Fields wrote:
>
> > It is probably as you suggest (for fanout or gate
> > loading requirements).   This brings to mind that
> > you could get 2 pseudo-random sequences from
> > one set of logic without changing taps-- just
> > invert the output. This would get you 2 CMDA
> > channels for the price of one inverter.
>
> I tend to disagree. The inverse of a PN code is not generaly orthogonal
> to the noninverted PN code.
>
> Bernie

11. Re: [SS:168] Re: PN sequencer

From: Bernie Doehner <bad@wireless.wdc.net>
Date: Mon, 10 Apr 1995 18:44:13 -0700 (PDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.950410181731.8033D-100000@wireless.wdc.net>
Rendered body type: text/plain

> Yes, this could be.
> By orthogonal, you mean little correlation?
> Is there a general theorem or do you have
> to look at each PN code on a case by case basis?
> Regards,
> Julian

We could take this to formal Probability, but lets start with
something simple:

Take sin(x), inverted you get -sin(x).
sin(x) is NEVER orthogonal to -sin(x). The only way to get orthogonality
is with another carrier/signal separated by 90 degrees (Ie. cos(x)).

To paraphrase your statement:
given any sequence, I can do CDMA, by inverting the sequence.
In order to maximize isolation between users, you must use orthogonal
codes. Using inverses, may reduce crosscorrelation between certain pairs
of PN codes, but is not generaly true.

If you quantize "my" sin(x) to 1 bit (sqare wave). The same point still
holds (inverse of a square wave is not orthogonal to the original).
I have just given you one possible PN codes for which your statement
doesn't hold, hence it's not generaly applicable.

As far as I know, the only way I know of to get truely orthogonal is
through computation, or using the same PN sequence twice, but running the
clock of one of these sequences at an integral multiple of the other. In
essense frequency division multiplexing the PN codes.

Bernie

12. Does DSSS actually reduce AWGN ?

From: Per-Tore Aasestrand <c-three@telepost.no>
Date: Thu, 11 Apr 1996 13:57:21 +0200
To: ss@tapr.org
Message-ID: <199604111157.401.telepost.no@telepost.no>
Rendered body type: text/plain

I have just been reading parts of the book by Dr. Kamilo Feher: "Wireless
Digital Communications", P-H 1995. In his introduction to spread-spectrum he
writes:

"Bandwidth expansion is achieved by a second modulation means, a means that
is independent of the information message. For this reason this expansion
does not combat additive white Gaussian noise, as does wideband FM."

(Later he is elaborating further on this. If you give me your fax number, I
can send you a copy of the two pages in question.)

This statement has puzzled me quite a bit, maybe because I just don't
understand him correctly. But I have always had the impression that this was
just what DSSS was able to do - reduce the thermal noise by a factor
approximately equeal to the processing gain! This is the fundamental issue
for the GPS system, which operates at -30 dB S/N ratio in the receiver
front-end!

I would very much appreciate your comment on this.

73'es de

LA7NO
Per-Tore

Per-Tore Aasestrand	E-mail : c-three@telepost.no
C-Three Systems AS	Fax : + 47 - 55 23 18 88
P.O. Box 1708	Voice : + 47 - 55 32 67 67
N-5024 Bergen, Norway	Mobile : + 47 - 92 04 44 76

13. Re: [SS:174] Does DSSS actually reduce AWGN ?

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 11 Apr 96 07:13:27 UTC
To: ss@tapr.org
Message-ID: <9660@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Per-Tore,

I believe Dr. Feher is means that there is no noise benefit from the
spreading-despreading process. Its a trade off. When u spread, the signal
goes down to the noise level (at the reciever), but when u despread in the
reciever, the S/N ratio of the resulting signal, is the same as if the
transmission had been made by that resulting signal, without the spreading
and despreading.

With FM, however, above the threshold effect, the widening of the signal
results in an improvement of demodulated S/N ratio above and beyond the RF
S/N ratio by a factor of 3/2 Beta-squared. Where Beta is the modulation index,
which is the deviation / Maximun modulation Frequency.

With the DSSS spreading and despreading there is no gain of S/N by widening
the signal. The output S/N ratio is the same as the input S/N ratio. With
FM, tho, there is (above the threshold effect).

The biggest advantage of DSSS is the ability reduce the effects of delay
spread. Above 1 Ghz, these are a make-break problem in mobile communications.
I was particularily impressed by this, when N9HSI demonstrated the use of

a 1.2 Ghz 40 watt repeater to me on lunch break, one day. When we drove thru an intersection, the receiver wildely was driven between squelched and full scale. It seems that every street light, at the range we were at, was acting like a reflecting periscope antenna. And all these antennas did not neccasarily sum in phase, as we drove along. WBFM would not be able to combat this problem at all. While, DSSS with a RAKE receiver can.

73, Don. WB9MJN.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

14. DS (or anything) key management

From: Dirk-Jan Koopman <djk@chbi.co.uk>
Date: Thu, 11 Apr 1996 13:33:21 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960411132246.11599A-100000@dns.leather.chbi.co.uk>
Rendered body type: text/plain

In the UK, SS is technically illegal (well actually it isn't, but our licencing authorities will say it is if anybody uses it, so it is :-).

The good news is that they seriously wish to make it legal, but they have a fundemental problem which needs to be overcome (and is the reason that they say it is illegal) and that is DS key publication.

We need to find a mechanism which allows any suitably equiped amateur to be able to decode any licenced SS conversation. This is the only (real) stumbling block to legalising SS in the UK.

Has anyone got any thoughts as to how it might be possible to have many SS conversations going on using different keys and being able to resolve any one of them.

Is there an algorithm which generates suitably pseudo random keys based on some ID value such as frequency or callsign (or pseudo callsign identifying a 'net')? We have a requirement here in the UK for CWid every 30 minutes anyway which could be used to ID a seed value to the key generator.

Any thoughts?

Dirk

15. Re: [SS:173] Re: PN sequencer

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 11 Apr 1996 10:21:05 -0400
To: ss@tapr.org
Message-ID: <16D15250.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

You could THEORETICALLY achieve orthogonality using codes that are the exact opposite of each other. I say this only from the brief material that I have read on the subject. I haven't studied, in detail, this aspect os SS yet, so don't clobber me :)

Orthogonality would only come into play if there are two adjacent SS receivers. A way to alleviate this situation could be to have an "address" for each receiver or a specific sych code sent every few seconds. Or possibly use one PN sequence to clock another PN sequence.

Just a few thoughts...

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:173] Re: PN sequencer
Author: ss@tapr.org at BALT.SMTP
Date: 4/10/96 8:50 PM

> Yes, this could be.
> By orthogonal, you mean little correlation?
> Is there a general theorem or do you have
> to look at each PN code on a case by case basis?
> Regards,
> Julian

We could take this to formal Probability, but lets start with
something simple:

Take sin(x), inverted you get -sin(x).
sin(x) is NEVER orthogonal to -sin(x). The only way to get orthogonality
is with another carrier/signal separated by 90 degrees (Ie. cos(x)).

To paraphrase your statement:
given any sequence, I can do CDMA, by inverting the sequence.
In order to maximize isolation between users, you must use orthogonal
codes. Using inverses, may reduce crosscorrelation between certain pairs
of PN codes, but is not generaly true.

If you quantize "my" sin(x) to 1 bit (sqare wave). The same point still
holds (inverse of a square wave is not orthogonal to the original).
I have just given you one possible PN codes for which your statement
doesn't hold, hence it's not generaly applicable.

As far as I know, the only way I know of to get truely orthogonal is
through computation, or using the same PN sequence twice, but running the
clock of one of these sequences at an integral multiple of the other. In
essense frequency division multiplexing the PN codes.

Bernie

16. Re: [SS:174] Does DSSS actually reduce AWGN ?

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 11 Apr 1996 10:29:01 -0400
To: ss@tapr.org
Message-ID: <16D16D10.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Hi Per-Tore,

     Maybe what he means is spreading of the signal does not alleviate
     noise from the system and he was just giving an example. I can give
     you his e-mail address and you can ask him yourself.

     By the way, how do you like the book? I have thought of buying the
     book myself. Robert Buaas knows him personally and says he is a very
     smart man.

     73s de
     Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:174] Does DSSS actually reduce AWGN ?
Author: ss@tapr.org at BALT.SMTP
Date: 4/11/96 7:04 AM

I have just been reading parts of the book by Dr. Kamilo Feher: "Wireless
Digital Communications", P-H 1995. In his introduction to spread-spectrum he
writes:

"Bandwidth expansion is achieved by a second modulation means, a means that
is independent of the information message. For this reason this expansion
does not combat additive white Gaussian noise, as does wideband FM."

(Later he is elaborating further on this. If you give me your fax number, I
can send you a copy of the two pages in question.)

This statement has puzzled me quite a bit, maybe because I just don't
understand him correctly. But I have always had the impression that this was
just what DSSS was able to do - reduce the thermal noise by a factor
approximately equeal to the processing gain! This is the fundamental issue
for the GPS system, which operates at -30 dB S/N ratio in the receiver
front-end!

I would very much appreciate your comment on this.

73'es de

LA7NO
Per-Tore


```
----------------------------------+--------------------------------
| Per-Tore Aasestrand             | E-mail :  c-three@telepost.no |
| C-Three Systems AS              | Fax    :  + 47 - 55 23 18 88  |
| P.O. Box 1708                   | Voice  :  + 47 - 55 32 67 67  |
| N-5024 Bergen, Norway           | Mobile :  + 47 - 92 04 44 76  |
----------------------------------+--------------------------------
```


17. Re: [SS:174] Does DSSS actually reduce AWGN ?

From: Bernie Doehner <bad@wireless.wdc.net>
Date: Thu, 11 Apr 1996 07:34:53 -0700 (PDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960411073159.2139D-100000@wireless.wdc.net>
Rendered body type: text/plain

On Thu, 11 Apr 1996, Per-Tore Aasestrand wrote:

> I have just been reading parts of the book by Dr. Kamilo Feher: "Wireless
> Digital Communications", P-H 1995. In his introduction to spread-spectrum he
> writes:
>
> "Bandwidth expansion is achieved by a second modulation means, a means that
> is independent of the information message. For this reason this expansion
> does not combat additive white Gaussian noise, as does wideband FM."
>
> (Later he is elaborating further on this. If you give me your fax number, I
> can send you a copy of the two pages in question.)
>
> This statement has puzzled me quite a bit, maybe because I just don't
> understand him correctly. But I have always had the impression that this was
> just what DSSS was able to do - reduce the thermal noise by a factor
> approximately equeal to the processing gain! This is the fundamental issue
> for the GPS system, which operates at -30 dB S/N ratio in the receiver
> front-end!
>
> I would very much appreciate your comment on this.
>

This statement also puzzles me. Just the other day, I saw a short description in Dixon's book, that mentions the exact same thing (GPS operating at -30dB S/N) (I can dig it out later). Is it possible that Dr. Feher's bandwidth, when measuring the noise floor is different then Dixon's?

Bernie

18. Re: [SS:175] Re: Does DSSS actually reduce AWGN ?

From: ATVQ@aol.com
Date: Thu, 11 Apr 1996 10:52:47 -0400
To: ss@tapr.org
Message-ID: <960411105246_373417196@emout07.mail.aol.com>
Rendered body type: text/plain

I have not experienceed that effect at 1.2 ghz (lamp post multipath) I have had a similar experience with parallel walls of buildings while driving forming a "wave guide" with cancellation/reinforcement fields, but the wavelength was so short, and the speed high enough it was not perceptabel on the meter, only as a warble inthe audio. In the LA aea I find 1.2 range nearly equal to 2 meters.   73 Henry KB9FO.

19. Re: Does DSSS actually reduce AWGN ?

From: jra1854@tntech.edu (Jeffrey Austen)
Date: Thu, 11 Apr 1996 10:14:30 -0600
To: ss@tapr.org
Message-ID: <v01530501ad92cc4f53cf@[149.149.42.11]>
Rendered body type: text/plain

>I have just been reading parts of the book by Dr. Kamilo Feher: "Wireless
>Digital Communications", P-H 1995. In his introduction to spread-spectrum he
>writes:
>
>"Bandwidth expansion is achieved by a second modulation means, a means that
>is independent of the information message. For this reason this expansion
>does not combat additive white Gaussian noise, as does wideband FM."
>

>(Later he is elaborating further on this. If you give me your fax number, I
>can send you a copy of the two pages in question.)
>
>This statement has puzzled me quite a bit, maybe because I just don't
>understand him correctly. But I have always had the impression that this was
>just what DSSS was able to do - reduce the thermal noise by a factor
>approximately equeal to the processing gain! This is the fundamental issue
>for the GPS system, which operates at -30 dB S/N ratio in the receiver
>front-end!

The statement is correct: no form of SS will reduce the level of white noise.

This can be explained by analyzing the bandwidth at different points in a DSSS system. The signal power is constant whether spread or not. The noise power, however, depends on bandwidth because white noise has a constant power per unit frequency. If the signal bandwidth is increased by a factor of K when spreading the signal, the power remains the same; however, the noise power within the signal bandwidth, which is now K times as large, increases by a factor of K. When the signal is despread the inverse happens: the signal power again remains the same but the noise power decreases by a factor of K because the bandwidth has decreased. (White noise, when despread, is still white noise and has the same power per unit frequency as it did before the despreading operation.)

As an example, PANSAT uses BPSK DSSS with a chip rate of 1.25 Mc/s and a chip-to-bit ratio of 127 which provides a processing gain of 21 dB. Before despreading the signal bandwidth is approximately 2.5 MHz and after despreading it is approximately 19.7 kHz. That is a ratio of 127. The noise power in the 2.5 MHz bandwidth will be 127 (21 dB) times as large as the noise power in the 19.7 kHz bandwidth. That's where the "processing gain" lies.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505 U.S.A.

20. [SS:165] PN sequencer

From: Robert.Glassey@nmp.nokia.com
Date: Thu, 11 Apr 96 16:19:21 +0100
To: ss@tapr.org
Message-ID: <H00002920176bcff@MHS>
Rendered body type: text/plain

> When a shift register is used to produce a PN sequence, why is the
> output of the sequencer inverted? I am specifically refering to the
> use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,

> and THEN inverting the result, which then becomes the output of the
> "system." There was a discussion of this in October 1986 QEX (if
> anyone has this issue, I would appreciate a copy of the article) and
> also in the ARRL SS Sourcebook.

If I recall correctly, this was to prevent a lockout condition where the shift register contains all zeros. In this case the mod-2 addition of any generator polynomial will result in 0, thus in the next cycle the shift register will still be all zeros.

The inverter overcomes this problem, allowing the PN sequence generator to start from the all clear condition, ie reset.

I think there are still some other lockout states, like all 1's or 101010.. etc but they will depend upon the polynomial you use.

Cheers,

Rob

21. Re: [SS:176] DS (or anything) key management

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 11 Apr 1996 12:06:04 -0400
To: ss@tapr.org
Message-ID: <16D31FA0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Dirk,

One method you could use would be to limit the Pn sequences amateurs use. Here in the states we are allowed only three, but I hope that will change in the future :) . There are many such ways this can be implemented, but the most successful will be the easiest. SS is difficult enough without adding some esoteric descrambling algothrim into the mix!

Another possible idea is to give each user a unique address and with that address a particular PN sequence picked from a general "database" of PN sequences. This could be used in a net-like atmosphere, where only individuals of a given net have a particular PN sequence. For example, addresses 000-099 could use PN sequence [7,1], addresses 100-199 could use PN sequence [13,4,3,1] and so on.

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:176] DS (or anything) key management
Author: ss@tapr.org at BALT.SMTP
Date: 4/11/96 8:42 AM

In the UK, SS is technically illegal (well actually it isn't, but our licencing authorities will say it is if anybody uses it, so it is :-).

The good news is that they seriously wish to make it legal, but they have a fundemental problem which needs to be overcome (and is the reason that they say it is illegal) and that is DS key publication.

We need to find a mechanism which allows any suitably equiped amateur to be able to decode any licenced SS conversation. This is the only (real) stumbling block to legalising SS in the UK.

Has anyone got any thoughts as to how it might be possible to have many SS conversations going on using different keys and being able to resolve any one of them.

Is there an algorithm which generates suitably pseudo random keys based on some ID value such as frequency or callsign (or pseudo callsign identifying a 'net')? We have a requirement here in the UK for CWid every 30 minutes anyway which could be used to ID a seed value to the key generator.

Any thoughts?

Dirk

22. Re: [SS:178] Re: Does DSSS actually reduce AWGN ?

From: Julian Fields <jfields@cisco.com>
Date: Thu, 11 Apr 1996 10:15:18 -0700
To: ss@tapr.org
Message-ID: <199604111715.KAA00989@harrier.cisco.com>
Rendered body type: text/plain

> Hi Per-Tore,
>
> Maybe what he means is spreading of the signal does not alleviate
> noise from the system and he was just giving an example. I can give
> you his e-mail address and you can ask him yourself.
>
> By the way, how do you like the book? I have thought of buying the
> book myself. Robert Buaas knows him personally and says he is a very
> smart man.
>
> 73s de
> Tony, KE4ATO

Hi Tony,

I have just recently bought the book. It is mostly theory written
at a level for a 4th year class you would take in university or
maybe even masters level.
It is one of the top books out there on this subject.
Certainly Dr. Kamilo Feher knows his subject well!!

The only minor problem is that the book keeps refering to other papers

that I don't have access to, so I had to buy a second book
to fill in a few areas I had questions about.

Regards
Julian

23. Re: [SS:181] Re: Does DSSS actually reduce AWGN ?

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 11 Apr 1996 13:42:27 -0400
To: ss@tapr.org
Message-ID: <16D44750.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Jeff,

I would like to know your references for the discussion below. I would like to know more...

Also, aren't your involved in a receiver project for the PANSAT satellite? How is that coming along?

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:181] Re: Does DSSS actually reduce AWGN ?
Author: ss@tapr.org at BALT.SMTP
Date: 4/11/96 10:35 AM

>I have just been reading parts of the book by Dr. Kamilo Feher: "Wireless
>Digital Communications", P-H 1995. In his introduction to spread-spectrum he
>writes:
>
>"Bandwidth expansion is achieved by a second modulation means, a means that
>is independent of the information message. For this reason this expansion
>does not combat additive white Gaussian noise, as does wideband FM."
>
>(Later he is elaborating further on this. If you give me your fax number, I
>can send you a copy of the two pages in question.)
>
>This statement has puzzled me quite a bit, maybe because I just don't
>understand him correctly. But I have always had the impression that this was
>just what DSSS was able to do - reduce the thermal noise by a factor
>approximately equeal to the processing gain! This is the fundamental issue
>for the GPS system, which operates at -30 dB S/N ratio in the receiver
>front-end!

The statement is correct: no form of SS will reduce the level of white noise.

This can be explained by analyzing the bandwidth at different points in a DSSS system. The signal power is constant whether spread or not. The noise power, however, depends on bandwidth because white noise has a constant power per unit frequency. If the signal bandwidth is increased by a factor of K when spreading the signal, the power remains the same; however, the noise power within the signal bandwidth, which is now K times as large, increases by a factor of K. When the signal is despread the inverse happens: the signal power again remains the same but the noise power decreases by a factor of K because the bandwidth has decreased. (White noise, when despread, is still white noise and has the same power per unit frequency as it did before the despreading operation.)

As an example, PANSAT uses BPSK DSSS with a chip rate of 1.25 Mc/s and a chip-to-bit ratio of 127 which provides a processing gain of 21 dB. Before despreading the signal bandwidth is approximately 2.5 MHz and after despreading it is approximately 19.7 kHz. That is a ratio of 127. The noise power in the 2.5 MHz bandwidth will be 127 (21 dB) times as large as the noise power in the 19.7 kHz bandwidth. That's where the "processing gain" lies.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505 U.S.A.

24. Re: PN sequencer

From: jra1854@tntech.edu (Jeffrey Austen)
Date: Thu, 11 Apr 1996 13:24:32 -0600
To: ss@tapr.org
Message-ID: <v01530504ad9308d68b5f@[149.149.42.11]>
Rendered body type: text/plain

>>   When a shift register is used to produce a PN sequence, why is the
>> output of the sequencer inverted? I am specifically refering to the
>> use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,
>> and THEN inverting the result, which then becomes the output of the
>> "system." There was a discussion of this in October 1986 QEX (if
>> anyone has this issue, I would appreciate a copy of the article) and
>> also in the ARRL SS Sourcebook.
>
>If I recall correctly, this was to prevent a lockout condition where the
>shift register contains all zeros. In this case the mod-2 addition of
>any generator polynomial will result in 0, thus in the next cycle the
>shift register will still be all zeros.
>
>The inverter overcomes this problem, allowing the PN sequence generator
>to start from the all clear condition, ie reset.
>
>I think there are still some other lockout states, like all 1's or
>101010.. etc but they will depend upon the polynomial you use.

The previous notes did not make clear that the inverter is in the feedback loop as well as being the point where the output is taken. If the output of this circuit is inverted the result is identical to the output of the circuit without the inverter. The "lockout" state is now all 1s instead of all 0s; in this state the output would be a continuous stream of 1s. Because the '164 has a clear input but does not have a preset input the circuit with the inverter is more practical since this one state can be avoided. The circuit shown in the Spread Spectrum Sourcebook (chapter 8, page 5) does not take advantage of this; an RC circuit to force the /clear input active would insure proper startup when power is applied -- add a capacitor from pin 9 to ground.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505   U.S.A.

25. Re: [SS:186] Re: PN sequencer

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 11 Apr 1996 18:03:05 -0400
To: ss@tapr.org
Message-ID: <16D81E20.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

This same type of thing can be also be accomplished inside a PLD. The
     Atmel ATV750 has a power-on reset state, so the device is reset
     automatically when power is applied. A really nice part. And they're
     cheap too :) But you need the right programmer :(

     I received a note from Bob Buaas on this subject. The inverter is
     needed to fullfill the PN sequence equation: x^7 + x + 1. The +1 part
     is the inverter; otherwise the sequence would converge after 127 clock
     pulses. I'll will into this matter some more...

     73s de
     Tony, KE4ATO

_____________________________ Reply Separator _____________________________
Subject: [SS:186] Re: PN sequencer
Author: ss@tapr.org at BALT.SMTP
Date: 4/11/96 1:35 PM

>>   When a shift register is used to produce a PN sequence, why is the
>> output of the sequencer inverted? I am specifically refering to the
>> use of an 8-bit shift register (74'164), modulo-2 adding bits 1 and 7,
>> and THEN inverting the result, which then becomes the output of the
>> "system." There was a discussion of this in October 1986 QEX (if
>> anyone has this issue, I would appreciate a copy of the article) and
>> also in the ARRL SS Sourcebook.

>
>If I recall correctly, this was to prevent a lockout condition where the
>shift register contains all zeros. In this case the mod-2 addition of
>any generator polynomial will result in 0, thus in the next cycle the
>shift register will still be all zeros.
>
>The inverter overcomes this problem, allowing the PN sequence generator
>to start from the all clear condition, ie reset.
>
>I think there are still some other lockout states, like all 1's or
>101010.. etc but they will depend upon the polynomial you use.

The previous notes did not make clear that the inverter is in the feedback
loop as well as being the point where the output is taken. If the output
of this circuit is inverted the result is identical to the output of the
circuit without the inverter. The "lockout" state is now all 1s instead of
all 0s; in this state the output would be a continuous stream of 1s.
Because the '164 has a clear input but does not have a preset input the
circuit with the inverter is more practical since this one state can be
avoided. The circuit shown in the Spread Spectrum Sourcebook (chapter 8,
page 5) does not take advantage of this; an RC circuit to force the /clear
input active would insure proper startup when power is applied -- add a
capacitor from pin 9 to ground.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505   U.S.A.

26. Stanford Telecom web pages

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 08:57:09 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412125709.0068d150@mindport.net>
Rendered body type: text/plain

Stanford Telecom finally has web pages. They have a branch that
manufactures SS ASIC chips. I have a product brocure that is a couple of
years old. I've been keeping my eye on them for possible ASIC's we could
use for a SS modem design.

The web pages are not complete. The home page URL is

    http://www.stel.com

Here's a sample from the Wireless & Cable Products Group (WCP) page:

ASICs

WCP's wide range of ASICs for digital communications is the basis for its
range of standard and custom products. This rapidly-expanding group of
products provides solutions for a variety of sophisticated communications
functions in today's complex environment. WCP's ASIC products include
devices designed for:

   Demodulation
   Spread Spectrum
   Forward Error Correction
   Coding
   Decoding
   Direct Digital Synthesis (DDS)

WCP offers custom design services for special requirements. The Custom
Products group is staffed with experts in custom and semi-custom IC design
as well as system and application engineers to provide in-depth design
support to a wide range of customers. Devices are available in mil spec and
radiation-hardened versions as well as commercial packaging.

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

27. Stanford Telelcom part 2

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 08:57:22 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412125722.0069687c@mindport.net>
Rendered body type: text/plain

from the Wireless & Cable Products Group (WCP) page:

Wireless Communications

Spread spectrum wireless communications, once the exclusive purview of the military, has come into its own with applications ranging from CDMA phones, cordless PBX systems, vehicle positioning, and wireless LANS.

A spread spectrum system transmits both voice and data by spreading signals throughout the radio spectrum, often by employing direct-sequence modulation. Direct-sequence modulation (WCP's preferred method) transmits a high bit-rate pseudo-random code interspersed with the data signals over a broad bandwidth. This produces a highly efficient output that is much more difficult to decipher than linear, single-frequency transmissions. The receiving end efficiently recombines the dispersed and differentially transmitted signals, reproducing the original analog signal. Spread spectrum provides a secure transmission that is highly noise-resistant.

A 1995 focus group study conducted by IDC, "Small Business and 13 Corporation Wireless Data Applications and Services, showed that, though only 4.5% of the participants had already installed wireless LANS, 52.5% were in the evaluation process or about to implement Wireless LANs in their corporations. WCP is providing wireless LAN architectures currently being adopted in Europe by ETSI.

Stanford Telecom has been a leader in spread spectrum since its inception. The company's founders were instrumental in developing the fundamental waveforms for this technology. Today, WCP provides products for wireless local loop CDMA telephony, like "Airspan," a wireless telephone system developed by DSC Communications that is used by British Telephone and International TelCell, among others. Stanford Telecom's CDMA architecture is based on a patented orthogonal CDMA technology that greatly reduces the effect of signal multipath interference.

In vehicle tracking and positioning, WCP spread spectrum products are being used in applications including tracking police cars and taxis, providing GPS/cellular vehicle assistance service, and other vehicle positioning systems.

Spread Spectrum Wireless Communications Products

   STEL-2000A: This fast acquisition, wireless burst processor provides IF to TX/RX data on a single chip. It automatically tracks the carrier and processes data at rates up to 2.048 Mbps.

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

28. SS Books - Must haves

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 08:58:53 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412125853.0069cafc@mindport.net>
Rendered body type: text/plain

Here are are three SS books I recommend. All three are must haves:

"THE" Reference Book (revised from a previous 3 vol set):
Spread Spectrum Communications Handbook, Revised Edition
by Marvin K. Simon, Jim K. Omura, Robert A. Scholtz, and Barry K. Levitt
McGraw-Hill, 1994
ISBN: 0-07-057629-7
Price: US$ 99.50

Excellent text, theory and mathematical:
Introduction to Spread Spectrum Communications, 1/e
by Rodger L. Peterson, Rodger E. Ziemer, and David E. Borth
Prentice Hall, 1995
ISBN: 0-201-431623-7
Price: US$ 82.00

Practically oriented, Dixon is a "father" (of sorts) of civilian SS:

Spread Spectrum Systems with Commercial Applications, 3rd Ed.
by Robert C. Dixon
John Wiley & Sons, 1994
ISBN: 0-471-59342-7
Price: US$ 79.95

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

29. Possible SS modem

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 08:59:30 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412125930.0069220c@mindport.net>
Rendered body type: text/plain

>From Randy's SSS online mag...

Digital Wireless Corporation, Norcross, GA recently announced its new
WIT2400 SS OEM frequency hopping transceiver with "12 dB More Receive
Sensitivity" (more than a "wet Noodle?"). They also have the WIT915 with a
full one Watt output power available. For more information, contact them at
TEL: +1 770-564-5540 or FAX: +1 770-564-5541 -- I really think they have a
pretty good product!

I'll phone them for a quote. Any thoughts from the group?

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

30. Re: [SS:183] Re: DS (or anything) key management

From: Dirk-Jan Koopman <djk@chbi.co.uk>
Date: Fri, 12 Apr 1996 14:25:25 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960412140710.15442C-100000@dns.leather.chbi.co.uk>
Rendered body type: text/plain

On Thu, 11 Apr 1996, LANIER.R.A- wrote:

>   Dirk,
>
>   One method you could use would be to limit the Pn sequences amateurs
>   use. Here in the states we are allowed only three, but I hope that
>   will change in the future :) . There are many such ways this can be
>   implemented, but the most successful will be the easiest. SS is
>   difficult enough without adding some esoteric descrambling algothrim
>   into the mix!
>

I don't much like this idea 'cos I really would like not to limit the
PN sequences available. In any case, our licencing authorities try not to
pose limitations of this sort because it is too limiting. This is why we
have no limitations as to digital protocol here in the UK (ie we don't
need to use AX25 for everything).

>   Another possible idea is to give each user a unique address and with
>   that address a particular PN sequence picked from a general "database"
>   of PN sequences. This could be used in a net-like atmosphere, where
>   only individuals of a given net have a particular PN sequence. For
>   example, addresses 000-099 could use PN sequence [7,1], addresses
>   100-199 could use PN sequence [13,4,3,1] and so on.

In an ideal world I would like to have a (series of) 'scannable' PN sequence
generating algorithm. The idea would be to have a standard algorithm
which can take a number from 0-nnn(n..) and generate a sequence. A receiver
could then have a 'dial' which you would 'twiddle' to scan the range of
PN sequences in exactly the same way as you would twiddle the dial of
your favourite receiver. This assumes you would remain on the
same frequency - of course you then have the problem of dealing with
multiple frequencies.

My problem is that my maths isn't sufficient to deal with this problem. I
am sure it is do-able, I just don't know how - hence my plea on this list.

To make it easier (possibly), I don't need an exact algorithm for the purposes of getting things moving over here - what I am looking for is a protocol (in the political/discussion sense) of how to make _publicly_ available any PN sequences being used.

The crucial licencing point is that any suitably equipped amateur must, relatively easily, be able to resolve any signal from any other amateur. If there is a form of words that achieves this then this would unlock our regulatory gates.

Can anyone help?

Dirk

31. Re: [SS:189] Stanford Telelcom part 2

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 12 Apr 1996 10:42:09 -0400
To: ss@tapr.org
Message-ID: <16E6B930.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

What is the URL for this web page?

_____ Reply Separator _____
Subject: [SS:189] Stanford Telelcom part 2
Author: ss@tapr.org at BALT.SMTP
Date: 4/12/96 8:16 AM

from the Wireless & Cable Products Group (WCP) page:

Wireless Communications

Spread spectrum wireless communications, once the exclusive purview of the military, has come into its own with applications ranging from CDMA phones, cordless PBX systems, vehicle positioning, and wireless LANS.

A spread spectrum system transmits both voice and data by spreading signals throughout the radio spectrum, often by employing direct-sequence modulation. Direct-sequence modulation (WCP's preferred method) transmits a high bit-rate pseudo-random code interspersed with the data signals over a broad bandwidth. This produces a highly efficient output that is much more difficult to decipher than linear, single-frequency transmissions. The receiving end efficiently recombines the dispersed and differentially transmitted signals, reproducing the original analog signal. Spread spectrum provides a secure transmission that is highly noise-resistant.

A 1995 focus group study conducted by IDC, "Small Business and 13 Corporation Wireless Data Applications and Services, showed that, though only 4.5% of the participants had already installed wireless LANS, 52.5% were in the evaluation process or about to implement Wireless LANs in their corporations. WCP is providing wireless LAN architectures currently being adopted in Europe by ETSI.

Stanford Telecom has been a leader in spread spectrum since its inception. The company's founders were instrumental in developing the fundamental waveforms for this technology. Today, WCP provides products for wireless local loop CDMA telephony, like "Airspan," a wireless telephone system developed by DSC Communications that is used by British Telephone and International TelCell, among others. Stanford Telecom's CDMA architecture is based on a patented orthogonal CDMA technology that greatly reduces the effect of signal multipath interference.

In vehicle tracking and positioning, WCP spread spectrum products are being used in applications including tracking police cars and taxis, providing GPS/cellular vehicle assistance service, and other vehicle positioning systems.

Spread Spectrum Wireless Communications Products

STEL-2000A: This fast acquisition, wireless burst processor provides IF to TX/RX data on a single chip. It automatically tracks the carrier and processes data at rates up to 2.048 Mbps.

- Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

32. Re: [SS:191] Possible SS modem

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 12 Apr 1996 10:47:35 -0400
To: ss@tapr.org
Message-ID: <16E6E260.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Do they have a web page or a catalog?

Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:191] Possible SS modem
Author: ss@tapr.org at BALT.SMTP
Date: 4/12/96 8:17 AM

>From Randy's SSS online mag...

Digital Wireless Corporation, Norcross, GA recently announced its new WIT2400 SS OEM frequency hopping transceiver with "12 dB More Receive Sensitivity" (more than a "wet Noodle?"). They also have the WIT915 with a full one Watt output power available. For more information, contact them at TEL: +1 770-564-5540 or FAX: +1 770-564-5541 -- I really think they have a pretty good product!

I'll phone them for a quote. Any thoughts from the group?

- Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

33. Re: Does DSSS actually reduce AWGN ?

From: jra1854@tntech.edu (Jeffrey Austen)
Date: Fri, 12 Apr 1996 09:52:23 -0600
To: ss@tapr.org
Message-ID: <v01530500ad941bde6bc8@[149.149.42.11]>
Rendered body type: text/plain

> Also, aren't your involved in a receiver project for the PANSAT
> satellite? How is that coming along?

Yes. A bit of background first. I am teaching a senior telecommunications course here at TTU (visit us via the World-Wide Web at http://www.tntech.edu/). As part of the course we need to have a "major design project." This semester we chose to build the basic parts of a PANSAT receiver. The enrollment is quite small, being only four students (no falling asleep in my class!), so the scope of the project had to be limited.

We did not address the down conversion or amplification part of the receiver since those parts can be readily obtained "off the shelf." The project involves taking in 21.4 MHz SS signal, with doppler shift still present, and despreading and demodulating it. I constructed a test transmitter, using a 16V8 PAL and a Mini-Circuits mixer, which generates the PN sequence, synchronization pulse, and modulates the output of a signal generator. The students task is to demodulate that signal. As the PANSAT design is based on packet radio and uses ARQ (automatic repeat request (or query)) for error control I imposed stringent synchronization time specifications on the project. It turns out that these specifications are complicating the design; actually the real problem is that ARQ and SS in general do not go well together because it takes some time to obtain code synchronization unless special techniques are used.

The design and simulation phases are complete. Construction and testing are now being performed. The project will terminate at the end of the semester and I'll report on it some time after that.

> I would like to know your references for the discussion below. I would
> like to know more...

The best place to start is one of many digital communications books that devote at least a chapter to SS. There are also some tutorial papers. They are:

Scholtz, R. A., The Spread Spectrum Concept, IEEE Trans. Commun.,

vol. COM-25, pp. 748-755, August 1977.

Pickholtz, R. L., Schilling, D. L., and Milstein, L. B., Theory of Spread Spectrum Communications - A Tutorial, IEEE Trans. Commun., vol. COM-30, PP. 855-884, May 1982.

Viterbi, A. J., Spread Spectrum Communication - Myths and Realities, IEEE Commun. Magazine, vol. 17, pp. 11-18, May 1979.

Viterbi, A. J., When not to Spread Spectrum - A Sequel, IEEE Commun. Magazine, vol. 23, pp. 12-17, April 1985.

After that there are some more specialized books. They are:

Introduction to Spread Spectrum Communications, R. L. Peterson, R. E. Ziemer, and D. E. Borth, Prentice-Hall, 1995.
This book is for "anyone having previous courses on basic communication theory ... Fourier theory ... probability and random processes."
It is targeted for teaching at the graduate and senior undergraduate levels. After an introductory chapter on digital communications and a chapter introducing SS systems it goes into details on various topics important to SS. The other chapters are: code sequence generators, initial synchronization, tracking, performance in a jamming environment (note that "jamming" includes interfering sources), forward error correction, fading, CDMA, and low probability of intercept. I recommend this book and for anybody doing experimenting with SS systems I would say this book is a necessity.

CDMA: Principles of Spread Spectrum Communication, A. J. Viterbi, Addison-Wesley, 1995.
The author states that the reader should have "at least an undergraduate electrical engineering background with some probability and communication engineering content." But then he goes on to say that "graduate course in communication theory ... would be preferable." I believe the second sentence is much closer to reality for two reasons: scope and mathematical level. This book does not provide much of an introduction to SS systems but instead almost immediately dives into the details; the reader without a basic understanding will quickly be lost. There is much use of probability and random processes and a reader not comfortable with these concepts will also be lost. This is a very good book but I would not recommend it to a person who does not have the necessary background.

Wireless Digital Communications: Modulation and Spread Spectrum Applications, K. Feher, Prentice-Hall, 1995.
The only reason I am listing this book is that it was mentioned in a previous message. It is more of an overview of "wireless" (funny how that term is now in vogue ... again) communications with some emphasis on mobile and cellular systems. The level of this book is senior undergraduate and beginning graduate and the mathematical level is lower than either of the two books listed above. There is only one chapter on Spread Spectrum, totaling about 45 pages. Other topics are: digital modulation, speech coding, cellular concepts and coding. One thing which the reader will notice almost immediately is that Feher has several patents, such as FQPSK (Feher's QPSK), and it is obvious that one of the goals of writing this book is to make sure that the world knows about them. One appendix is devoted specifically to it, which would be alright if that was all, but it also pervades the text. This probably biases me slightly against the book but, regardless, I would not particularly recommend this book as there are others which do a better job of covering most of the topics.

Don't forget to look at Steven Bible's SS pages on the World-Wide Web. He has put together a large list of references. They can be found via the TAPR home page, http://www.tapr.org/ (I think).

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505 U.S.A.

34. Re: [SS:187] Re: PN sequencer

From: jra1854@tntech.edu (Jeffrey Austen)
Date: Fri, 12 Apr 1996 10:01:22 -0600
To: ss@tapr.org
Message-ID: <v01530501ad942cfc7155@[149.149.42.11]>
Rendered body type: text/plain

>   This same type of thing can be also be accomplished inside a PLD. The

Yes, PLDs are nice. Unfortunately the programmers are not cheap.

>   I received a note from Bob Buaas on this subject. The inverter is
>   needed to fullfill the PN sequence equation: x^7 + x + 1. The +1 part
>   is the inverter; otherwise the sequence would converge after 127 clock
>   pulses. I'll will into this matter some more...

No. The inverter is not necessary. Try the following.

Case 1: Original circuit, start with all zeros in the shift register.

Case 2: Same circuit except replace the inverter with a wire, start with
        all ones in the shift register.

Both generate a maximal length sequence. In fact, one sequence is the
inversion of the other. This is an interesting and non-intuitive result.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505   U.S.A.

35. Re: [SS:190] SS Books - Must haves

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 12 Apr 1996 10:57:23 -0400
To: ss@tapr.org
Message-ID: <16E70B80.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

I have the book by Peterson, Ziemer, and Borth. It is a good book, but
     it has *ALOT* of math! Not for the lighthearted! I contacted Ziemer,
     who is a professor of engineer in Colorado, and he sent me a solutions
     manual to the problems in the book. Having them helps to know that you
     are working the problems correctly. The first several chapters are
     readable, but take off exponentially after that!

     Dixon's book is probably the best practical book I have found so far.
     It is the only book I have seen that includes actual oscilloscope
     screen photos. This is a definite plus. I would recommend this one
     second to the ARRL SS Sourcebook. The sourcebook helps to get your
     feet wet, I think. Then Dixon's book and then ... ?

     73s de
     Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:190] SS Books - Must haves
Author: ss@tapr.org at BALT.SMTP
Date: 4/12/96 8:16 AM

Here are are three SS books I recommend. All three are must haves:

"THE" Reference Book (revised from a previous 3 vol set):
Spread Spectrum Communications Handbook, Revised Edition
by Marvin K. Simon, Jim K. Omura, Robert A. Scholtz, and Barry K. Levitt
McGraw-Hill, 1994
ISBN: 0-07-057629-7
Price: US$ 99.50

Excellent text, theory and mathematical:
Introduction to Spread Spectrum Communications, 1/e
by Rodger L. Peterson, Rodger E. Ziemer, and David E. Borth
Prentice Hall, 1995
ISBN: 0-201-431623-7
Price: US$ 82.00

Practically oriented, Dixon is a "father" (of sorts) of civilian SS:
Spread Spectrum Systems with Commercial Applications, 3rd Ed.
by Robert C. Dixon
John Wiley & Sons, 1994
ISBN: 0-471-59342-7

Price: US$ 79.95

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

36. Re: [SS:195] Re: Does DSSS actually reduce AWGN ?

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 12 Apr 96 10:02:35 UTC
To: ss@tapr.org
Message-ID: <9762@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Jeff,

 About that sleeping in class! Look who is talking?! Hi Hi hi....

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

37. Re: [SS:194] Re: Possible SS modem

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 13:00:48 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412170048.006964fc@mindport.net>
Rendered body type: text/plain

At 10:07 AM 4/12/96 -0500, you wrote:
>   Do they have a web page or a catalog?
>

Not that I could find using normal search engines.

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

38. Re: [SS:193] Re: Stanford Telelcom part 2

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 13:03:19 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412170319.00690104@mindport.net>
Rendered body type: text/plain

At 09:43 AM 4/12/96 -0500, you wrote:
>   What is the URL for this web page?

    http://www.stel.com

Then search for the Wireless & Cable Products Group (WCP) page.

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

39. Re: [SS:191] Possible SS modem

From: Dirk-Jan Koopman <djk@chbi.co.uk>
Date: Fri, 12 Apr 1996 17:48:32 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960412174820.15930F-100000@dns.leather.chbi.co.uk>
Rendered body type: text/plain

How much? :-)

On Fri, 12 Apr 1996, Steven R. Bible wrote:

> >From Randy's SSS online mag...
>
> Digital Wireless Corporation, Norcross, GA recently announced its new

> WIT2400 SS OEM frequency hopping transceiver with "12 dB More Receive
> Sensitivity" (more than a "wet Noodle?"). They also have the WIT915 with a
> full one Watt output power available. For more information, contact them at
> TEL: +1 770-564-5540 or FAX: +1 770-564-5541 -- I really think they have a
> pretty good product!
>
> I'll phone them for a quote. Any thoughts from the group?
>
> - Steve, N7HPR
>
> n7hpr@amsat.org
> n7hpr@tapr.org
>

40. Re: [SS:196] Re: PN sequencer

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 12 Apr 1996 15:36:45 -0400
To: ss@tapr.org
Message-ID: <16EB2960.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Jeff,

     The inverter IS needed assuming that you will reset the shift register
     (set the outputs to all zero's). The invert would not be needed if the
     shift register is preset (set the outputs to all one's). The
     assumption was never stated and hence the confusion.

     73s de
     Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:196] Re: PN sequencer
Author: ss@tapr.org at BALT.SMTP
Date: 4/12/96 10:08 AM

>   I received a note from Bob Buaas on this subject. The inverter is
>   needed to fullfill the PN sequence equation: x^7 + x + 1. The +1 part
>   is the inverter; otherwise the sequence would converge after 127 clock
>   pulses. I'll will into this matter some more...

No. The inverter is not necessary. Try the following.

Case 1: Original circuit, start with all zeros in the shift register.

Case 2: Same circuit except replace the inverter with a wire, start with
        all ones in the shift register.

Both generate a maximal length sequence. In fact, one sequence is the
inversion of the other. This is an interesting and non-intuitive result.

Jeff, k9ja

Jeffrey Austen | Tennessee Technological University
jra1854@tntech.edu | Box 5004
+1 615 372 3485 | Cookeville Tennessee 38505   U.S.A.

41. OEM SS Transceiver

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 19:06:14 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960412230614.0069ab68@mindport.net>
Rendered body type: text/plain

Reference my earlier posting...

I phoned Digital Wireless Corp. today and spoke with Tyler Churchill. She
was very help and faxed me some information on their two OEM products. She
is also sending in the mail more information. Here's what they have...

Digital Wireless Corp.
One Meca Way
Norcross, GA 30093
Phone: 770-564-5540
Fax: 770-564-5541

Model No. WIT915 - Wireless Industrial Transceiver

The literature says that the WIT915 uses a patented, proprietary form of
spread spectrum technology called "Recombiant Spread Spectrum (RSS).

Operating Modes:

- Asynchronous data rates user selectable 300 bps to 38400 bps

- Synchronous data rates user selectable 300 bps to 38400 bps

- Asych or Synchronous mode user selectable

- RF power output: user select either 1mW, 10mW, 100mW or 1W.
  Adaptive Transmit Power (full duplex) provides automatic scaling to
  the minimum power necessary to maintain high link quality.

- RF channel: user select one of 21 available, non-overlapping
  frequency channels. Frequency Agility (full duplex) enables
  transceivers to automatically move to a clear channel in case of
  interference.

- Half or full-duplex, user selectable.

- The WIT915 offers a carrier detect signal (DCD) with a random
  backoff period which can be used to implement a CSMA network.

General Specifications:

- RF Frequency - 902-928 MHz
- Part 15
- Operating Range - 1000 feet typical, over one mile line of sight
- Serial Data Interface - Asynchronous or Synchronous Data
- I/O Data Rate - 52.38 Kbps
- RF Bandwidth - 1MHz
- Number of Frequency Channels - 21
- Wakeup TIme
  - From Powerup - 54 ms
  - From Sleep Mode - 21 ms
- Turnaround Time (Half-Duplex)
  - Transmit -> Receive - <500 us
  - Receive -> Transmit - <500 us
- Transmit Power - Adjustable from 1mW to 1 W
- Supply Voltage - 7.0 V min, 8.4 V nominal, 10.0 V max
- Current Drain (Typical)
  - Half-Duplex
    Transmit - 195 mA to 452 mA
    Receive - 122 mA
  - Full-Duplex
    Receive/Transmit - 158 mA to 286 mA
    Receive Only - 122 mA
  - Sleep Mode - 750 uA
Physical Dimensions - 2.3" x 2.9" x .8"
Weight - 4.5 oz. (without antenna)
Operating Temperature - 0 deg C to 70 deg C
Humidity - 20% to 90% (non-condensing)

Accessories:

- RS-232 Interface Adapter Board
- Battery Charger Board
- 1/4 Wave Rubber Whip Antenna
- Inverted-F Planar Antenna

Prices:

- Package unit - $850.00 each (first 2 units)
  (includes RS-232 adapter, power supply, batter backup, antenna and software)

  **** For a limited time ****
       (Cash/COD/Mastercard/Visa) $700.00 per unit, limit 2.

- 1-99 $720.00 each ($80.00 for RS-232 Adapter)
- 100-499 $640.00 each ($65.00 for RS-232 Adapter)
- 500-999 $540.00 each ($55.00 for RS-232 Adapter)
- 1K+ $440.00 each ($50.00 for RS-232 Adapter)

Model WIT2400 Frequency Hopping Transceiver

- Asynchronous or syschronous serial data interface
- Either point-to-point or multipoint operation
- up to 115 kbps data rate
- Supports up to 255 nodes on a single network channel
- License free operation in the 2400-2483 MHz band
- Error free network protocol using Automatic Repeat Request (ARQ)
  and Forward Error Correction (FEC)
- Range is typically 300-400 feet indoors and 1000 feet outdoors
  for line-of-site operation

General Specifications:

- 2400-2483 MHz
- Network Topology - Star network
- Network Protocol - CSMA/CA with ARQ and FEC
- Serial Data Interface - Asynchronous (RS-232) or synchronous CMOS levels
- I/O Data Rate - Up to 115 Kbps, half duplex
- Channel Data Rate - 250 Kbps
- Number of Frequency Channels - 82
- RF Bandwidth - 400 KHz
- Transmit Power Output - 10 mW or 100 mW, programmable
- Receiver Sensitivity - -95 bDm
- Supply Voltage - 5.5 V to 9 V
- Current Consumption - Remote Station 16 mA - 145 mA;
  25 mA typ avg operating current
- Physical Diamensions - 2.3" x 2.9" x 0.7"
- Weight - 6 oz (without antenna)
- Operating Temp - -20 deg C to 70 deg C
- Humidity - 20% to 90% (non-condensing)

Prices:

- Package Sample Units - $850.00 each (first 2 units)
  (includes RS-232 adapter, power supply, batter backup, antenna and software)

  **** For a limited time ****
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- 1-99 $590.00 each
- 100-249 $525.00 each
- 250-499 $480.00 each
- 500-749 $440.00 each
- 750-999 $395.00 each
- 1K+ $360.00 each

Barry tells me that Proxim has an OEM SS modem.

OEM RangeLAN2 1.6 Mbps 2.4 GHz FH modem

     http://www.proxim.com/proxim/products/oem/oem.htm

Don't know the prices.

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

42. Re: [SS:191] Possible SS modem

From: "Steven R. Bible" <n7hpr@tapr.org>
Date: Fri, 12 Apr 1996 19:03:35 -0400
To: ss@tapr.org
Cc: Dan E Carlisle <dec@cellcom.com>
Message-ID: <1.5.4b12.32.19960412230335.0068f174@mindport.net>

Rendered body type: text/plain

Hello Dan,

Spread Spectrum Scene is at

    http://www.sss-mag.com

For other spread spectrum related web pages see

    http://www.tapr.org/ss/other.html

- Steve N7HPR

At 03:49 PM 4/12/96 -0500, you wrote:
>What is the URL for "Randy's SSS online mag"?
>Thanks.
>
>Dan Carlisle, WK8L
>dec@cellcom.com
>
>On Fri, 12 Apr 1996, Steven R. Bible wrote:
>
>> >From Randy's SSS online mag...
>>
>> Digital Wireless Corporation, Norcross, GA recently announced its new
>> WIT2400 SS OEM frequency hopping transceiver with "12 dB More Receive
>> Sensitivity" (more than a "wet Noodle?"). They also have the WIT915 with a
>> full one Watt output power available. For more information, contact them at
>> TEL: +1 770-564-5540 or FAX: +1 770-564-5541 -- I really think they have a
>> pretty good product!
>>
>> I'll phone them for a quote. Any thoughts from the group?
>>
>> - Steve, N7HPR
>>
>> n7hpr@amsat.org
>> n7hpr@tapr.org
>
>
>
>
>

 - Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

43. OEM SS Transceivers

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Tue, 16 Apr 1996 20:14:26 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960417001426.00677c6c@gnatnet.net>
Rendered body type: text/plain

Reference my earlier posting...

I phoned Digital Wireless Corp. today and spoke with Tyler Churchill. She
was very help and faxed me some information on their two OEM products. She
is also sending in the mail more information. Here's what they have...

Digital Wireless Corp.
One Meca Way
Norcross, GA 30093
Phone: 770-564-5540
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Model No. WIT915 - Wireless Industrial Transceiver

The literature says that the WIT915 uses a patented, proprietary form of
spread spectrum technology called "Recombiant Spread Spectrum (RSS).

Operating Modes:

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- Synchronous data rates user selectable 300 bps to 38400 bps

- Asych or Synchronous mode user selectable

- RF power output: user select either 1mW, 10mW, 100mW or 1W.
  Adaptive Transmit Power (full duplex) provides automatic scaling to
  the minimum power necessary to maintain high link quality.

- RF channel: user select one of 21 available, non-overlapping
  frequency channels. Frequency Agility (full duplex) enables
  transceivers to automatically move to a clear channel in case of
  interference.

- Half or full-duplex, user selectable.

- The WIT915 offers a carrier detect signal (DCD) with a random
  backoff period which can be used to implement a CSMA network.

General Specifications:

- RF Frequency - 902-928 MHz
- Part 15
- Operating Range - 1000 feet typical, over one mile line of sight
- Serial Data Interface - Asynchronous or Synchronous Data
- I/O Data Rate - 52.38 Kbps
- RF Bandwidth - 1MHz
- Number of Frequency Channels - 21
- Wakeup TIme
  - From Powerup - 54 ms
  - From Sleep Mode - 21 ms
- Turnaround Time (Half-Duplex)
  - Transmit -> Receive - <500 us
  - Receive -> Transmit - <500 us
- Transmit Power - Adjustable from 1mW to 1 W
- Supply Voltage - 7.0 V min, 8.4 V nominal, 10.0 V max
- Current Drain (Typical)
  - Half-Duplex
    Transmit - 195 mA to 452 mA
    Receive - 122 mA
  - Full-Duplex
    Receive/Transmit - 158 mA to 286 mA
    Receive Only - 122 mA
  - Sleep Mode - 750 uA

Physical Dimensions - 2.3" x 2.9" x .8"
Weight - 4.5 oz. (without antenna)
Operating Temperature - 0 deg C to 70 deg C
Humidity - 20% to 90% (non-condensing)

Accessories:

- RS-232 Interface Adapter Board
- Battery Charger Board
- 1/4 Wave Rubber Whip Antenna
- Inverted-F Planar Antenna

Prices:

- Package unit - $850.00 each (first 2 units)
  (includes RS-232 adapter, power supply, batter backup, antenna and software)

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Model WIT2400 Frequency Hopping Transceiver

- Asynchronous or syschronous serial data interface
- Either point-to-point or multipoint operation
- up to 115 kbps data rate
- Supports up to 255 nodes on a single network channel
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- I/O Data Rate - Up to 115 Kbps, half duplex
- Channel Data Rate - 250 Kbps
- Number of Frequency Channels - 82
- RF Bandwidth - 400 KHz
- Transmit Power Output - 10 mW or 100 mW, programmable
- Receiver Sensitivity - -95 bDm
- Supply Voltage - 5.5 V to 9 V
- Current Consumption - Remote Station 16 mA - 145 mA;
25 mA typ avg operating current
- Physical Diamensions - 2.3" x 2.9" x 0.7"
- Weight - 6 oz (without antenna)
- Operating Temp - -20 deg C to 70 deg C
- Humidity - 20% to 90% (non-condensing)

Prices:

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- 1-99 $590.00 each
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- 500-749 $440.00 each
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- 1K+ $360.00 each

Barry tells me that Proxim has an OEM SS modem.

OEM RangeLAN2 1.6 Mbps 2.4 GHz FH modem

http://www.proxim.com/proxim/products/oem/oem.htm

Don't know the prices.

- Steve, N7HPR

n7hpr@amsat.org
n7hpr@tapr.org

- Steve, N7HPR

srbible@gnatnet.net
n7hpr@amsat.org
n7hpr@tapr.org

44. PN sequences

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 17 Apr 1996 16:13:57 -0400
To: ss@tapr.org
Message-ID: <17551C20.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Hello to all,

I did some modeling of the PN sequence discussed last week. I used
Electronic Workbench v4.1 for the modeling. As I thought, if the shift
register is preset, then the inverter is not needed. I let this
simulation run for several hours. No convergence to zero was found. I
don't want to beat a dead horse, but just wanted to verify for myself
what would happen.

On another matter, has anyone done anything on data encoding/decoding?
More specificly, I'm looking for plans for a Viterbi encoder/decoder.
If you think another encoding scheme is better, I would like to hear
from you.

73s de
Tony, KE4ATO

45. Re: [SS:135] Re: File your comments in RM-8737!

From: Andrew Burnside <Andrew.Burnside@durham.ac.uk>
Date: Wed, 17 Apr 1996 15:51:07 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.SOL.3.91-941213.960417153255.29048B-100000@altair.dur.ac.uk>
Rendered body type: text/plain

On Sat, 9 Mar 1996 ATVQ@aol.com wrote:

> Why do I need a $1000 computer for a $100 camera and still have no
> transmitter/antenna, when I can use a $25 camera, a $99 transmitter and a $1
> antenna with a TV set I already own and have a complete two way video station
> for under $150.

Why exactly! Surely it would not be that hard to hook up a parallel port
camera to a SS modem. This could be done with a simple PIC or other
processor, to frame the data.

This is an area which amateurs can again lead the path. Little work has
been done on radio packet based Digital TV transmission. MPEG is of
limited use here, since packets may arrive out of order, unless a large
look-ahead buffer is used.

> Get real!   Hey computer video, fun toy, too big, too expensive, for us
> common working folks.

I can see why with dollars worth of analogue video equipment you are
anxious to protect your investment, but please don't let that prejudice
your views.

In an earlier article you extolled the virtues of NTSC. This counteracts
your claims of better quality for analogue video. Digital video is
certainly much better than NTSC. On the availability of digital TV sets,
we are bound to see them commonly available in the next few years, as
digital cable and satellite channels come online. But in the interim why
not contribute to the amateur community, and convert from digital to NTSC
or RGB in your station.

Andrew

You can only be knocked down if you are standing up.

Andrew.Burnside@durham.ac.uk
---

46. Any nibbles?? (was OEM SS Transceiver)

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Wed, 17 Apr 1996 20:29:29 -0400
To: ss@tapr.org
Message-ID: <1.5.4b12.32.19960418002929.0067ba4c@gnatnet.net>
Rendered body type: text/plain

I thought someone would comment on these prices. Granted the package price
of $700.00 is steep, but consider how much it costs to put up a WA4DSY
56kbps node. Either of these modems would be faster yet the distance would
be shorter.

Comments?

- Steve N7HPR

Model No. WIT915 - Wireless Industrial Transceiver

Prices:

- Package unit - $850.00 each (first 2 units)

  (includes RS-232 adapter, power supply, batter backup, antenna and software)

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- 1K+ $440.00 each ($50.00 for RS-232 Adapter)

Model WIT2400 Frequency Hopping Transceiver

Prices:

- Package Sample Units - $850.00 each (first 2 units)
  (includes RS-232 adapter, power supply, batter backup, antenna and software)

  **** For a limited time ****
       (Cash/COD/Mastercard/Visa) $700.00 per unit, limit 2.

- 1-99 $590.00 each
- 100-249 $525.00 each
- 250-499 $480.00 each
- 500-749 $440.00 each
- 750-999 $395.00 each
- 1K+ $360.00 each

 - Steve, N7HPR

srbible@gnatnet.net
n7hpr@amsat.org
n7hpr@tapr.org

47. Re: [SS:208] Any nibbles?? (was OEM SS Transceiver)

From: Greg Jones <wd5ivd@tapr.org>
Date: Wed, 17 Apr 1996 20:42:28 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199604180142.UAA21765@tapr.org>
Rendered body type: text/plain

> I thought someone would comment on these prices. Granted the package price
> of $700.00 is steep, but consider how much it costs to put up a WA4DSY
> 56kbps node. Either of these modems would be faster yet the distance would
> be shorter.
>
> Comments?
>
> - Steve N7HPR
>
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> - Package Sample Units - $850.00 each (first 2 units)
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>
> ---

Hi Steve.

As most of us know -- cost is everything in amateur radio.

While most of us on this list will agree that $700 for what the unit
provides is a reasonable price, to have impact on the amateur radio world we
have to provide those things at the 1000 unit price of $360 listed.

We have three populations to trace.

We have amateurs who are:
        1. end users and are moving to other perceived faster digital modes
        2. networkers who have been and understand the price of making things
work

3. experimenters who also understand the price of making things work

The first item is about 90% (my guess) of digital users.

The other two groups understand what doing digital communications over radio is about and can understand the problems and prices involved.

The problem is that item 1 (90%) is one reason why the DSY system or other similarly priced systems have not been as popular or wide spread as you would think. Both price and the required technical know-how eliminates a lot of this group. This is probably a politically incorrect thing to say, but most hams are not willing to pay the price for the performance in this group. A good example of this are the amateurs who are leaving amateur digital radio because they can do faster speeds over the telephone, but are not willing to understand the differences between the telephone and radio media.

Price is still an issue for group 2 because it limits the size and number of sites of the system they wish to implement. In addition, replacement units are less available for the system and in theory will produce longer downtime at sites.

A higher price point means that group 2 and 3 will purchase units to experiment and learn with, but will not have a major impact on amateur operations.

Considering the commercial price listed, that of $330 at 1000 units, I would guess that they have about $250 or less worth of investment in the hardware. Maybe someone familiar with the hardware can give a better estimate.

I feel confident that amateurs can produce a SS radio and make it have real impact for the amateur community. If TAPR where to do this, the overhead of doing this type of system would be about a 40% market up for an amateur unit and have a price around $450-$500 if we assume the cost is $300 or less. This is well within the correct price range for local access and a high participation level. Once you involve the amateur commercial groups, who can do much larger volumes the price should drop further.

We either work deals with commercial developers to get discounts for amateur experimentation and development (i.e. at the $300 to $400 price), which is hard to do because many business do not understand the relevant cross over between amateur and later commercial systems that are developed. Or we develop our own system -- which is more difficult and long term or we do something else ?

After engineering it comes down to marketing.

The issues become for a successful SS item in amateur radio:

1. unit has to at least do 38.4 or faster (all marketing based)
2. has to be a reliable design and rugged
3. has to be less than $500 -- more like $300 for most hams

Those are the big issues in order to hit the 90% of the amateur population.

My belief is that as experimenters it is important to push the envelope, but the final goal has to be to shot for something that can be used by the 90%. Many amateurs that do real work in advanced areas never pass along their work in a truly meaningful enough way in order to help the other 90% of the amateur community.

Anyway --- that is enough rambling for now.

Cheers - Greg

48. SS for position

From: Sean Warren-Cox (SWC) <seanw@hpqs0212.sqf.hp.com>
Date: Thu, 18 Apr 1996 10:22:38 BST
To: ss@tapr.org
Message-ID: <199604180922.AA089609358@hpqs0212.sqf.hp.com>
Rendered body type: text/plain

Hello Everybody,

I am new to this group and I am trying to find out as much about
Spread Spectrum Systems for accurate position identification.

I cannot use GPS as I do not have line of sight to satellites.
I would like to build a home grown transmitter(satellite) and
receiver to measure distance and bearing to less than 1 cm accuracy.
Note I do not have line of sight to my own transmitter either so
I guess I will have to use frequencies < 3GHz.

I have read around a bit, Spread Spectrum Systems with Commercial
Applications by Dixon and GPS Satellite Surveying by Leick. Can
anyone suggest books, articles, web sites where I might find
practical information on building my own system.

Many Thanks,

Sean

Sean Warren-Cox | sean@hpiplaa.sqf.hp.com
TSD direct line | tel: 0131 331 7080

---

49. Re: [SS:210] SS for position

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Thu, 18 Apr 1996 10:55:36 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199604181555.KAA21753@solar.cs.tamu.edu>
Rendered body type: text/plain

I guess I'm a little baffled. Where do you not have good satellite coverage,
but where you think you could do RF-based positioning without multipath?

The overhead angles for GPS work are not very restrictive.

73, gerry
n5jxs@tamu.edu

50. Re: [SS:207] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Thu, 18 Apr 1996 12:26:57 -0400
To: ss@tapr.org
Message-ID: <960418122656_472792863@emout16.mail.aol.com>
Rendered body type: text/plain

Digital has yet to be better than NTSC. So far every digital system has
digital artifacts these are visible defects in the picture. Jagged edges,
blocks of movement that dont exist, loss of detail, and digital takes a lot
more spectrum room than analog. Also if you look at the digital ATV
(advanced TV) spectrum, it is solid noise in composition, not coherent
sidebands as analog. Also the amplitude at every point inthe 6 MHz digital
spectrum is filled, much like FM, whereas analog ntsc has a decreasing
amplitude/frequency slope and thousands of "holes" and after 1 Mhz, the
sideband energy of analog TV is insignificant vs no difference in "sideband"
power for digital TV. The cheapest estimate for a digital TV set at NAB this
year was $3500 (receive only) in mass quantities, deliverable in a few months
if needed. I sure hate to pass by that $49 TV set at Sams's club to spend
$3500 for digital madness. The best estimates at NAB were digital TV
(so-called HDTV) in 5 years politically, and 25-40 years before NTSC is
replaced by HDTV.
     So keep those cards and letters comming. Analog NTSC is plenty good if
you use good analog NTSC equipment to rx/tx. There is NO visual improvement
in detail on HDTV, only the aspect ratio changes. This is because of the
 resolution limits of our EYES at normal viewing distances. The improved
resolution is only apparant on very large screen TV's which incorporate line
doubling (a receiver modification which has nothing to do with analog or
digital) to "erase" the scan lines and you can see the fuzzy out of focus
camera work better. As for hams leading the digital way.....take the lead
and write it up, I will publish it! But dont expect a stampede.   73 Henry

51. Re: File your comments in RM-8737!

From: "Ronald C. Barnes" <ka1kjz@tigger.jvnc.net>
Date: Thu, 18 Apr 1996 21:30:28 -0400
To: ss@tapr.org
Message-ID: <199604190130.AA06138@tigger.jvnc.net>
Rendered body type: text/plain

At 02:26 PM 4/18/96 -0500, ATVQ@aol.com wrote:
>Digital has yet to be better than NTSC. So far every digital system has
>digital artifacts these are visible defects in the picture. Jagged edges,
>blocks of movement that dont exist, loss of detail, and digital takes a lot

>more spectrum room than analog. Also if you look at the digital ATV
>(advanced TV) spectrum, it is solid noise in composition, not coherent
>sidebands as analog. Also the amplitude at every point inthe 6 MHz digital
>spectrum is filled, much like FM, whereas analog ntsc has a decreasing
>amplitude/frequency slope and thousands of "holes" and after 1 Mhz, the
>sideband energy of analog TV is insignificant vs no difference in "sideband"
>power for digital TV. The cheapest estimate for a digital TV set at NAB this
>year was $3500 (receive only) in mass quantities, deliverable in a few months
>if needed. I sure hate to pass by that $49 TV set at Sams's club to spend
>$3500 for digital madness. The best estimates at NAB were digital TV
>(so-called HDTV) in 5 years politically, and 25-40 years before NTSC is
>replaced by HDTV.
>   So keep those cards and letters comming. Analog NTSC is plenty good if
>you use good analog NTSC equipment to rx/tx. There is NO visual improvement
>in detail on HDTV, only the aspect ratio changes. This is because of the
> resolution limits of our EYES at normal viewing distances. The improved
>resolution is only apparant on very large screen TV's which incorporate line
>doubling (a receiver modification which has nothing to do with analog or
>digital) to "erase" the scan lines and you can see the fuzzy out of focus
>camera work better. As for hams leading the digital way.....take the lead
>and write it up, I will publish it! But dont expect a stampede.   73 Henry
>
>
>
Its amazing that a person who has NO CLUE as the ATSC's proposal for HDTV
and of Digital Television in general can speak on such a subject with so
much vehemence.

Digital video has been proven, in many ways, on a daily basis for several
years. Digital video is used by most major broadcasters either in the tape
machine, or in distribution.

I will answer each point in turn....

Motion artifacts are a consequence of digital compression rather than the
sheer fact it is digital. In an MPEG-2 system, depending on the compression
ratio used, no motion artifacts are visible. WOuld it suprise you to know
that ALL of HBO's services (HBO, HBO-2, 3, etc, Cinemax, etc) are DIGITAL?
Each channel is MPEG-2 compressed, actually DigiCipher 2 compressed, and
sent to the satellite as a digital bitstream. HBO is not the only service
to be DG2 compressed, Speedvision, Outdoor Life, TV Food Network and 5 of
the 6 Viewer's Choice channels are distributed in this manner. There are
many others digitally distributed, the list is endless.

Also on the subject of digital compression, did you know that most of the
top 40 ADI broadcast television stations and most cable networks are using
digital VTRS? I just got back from the Sony training class on the DVW-A500
Digital Betacam VTR and that unit uses a 2:1 lossless compression of the
data. In fact, DBETA is far superior in resolution than Analog Beta. Did
you realize that the HBO services use D2 decks, using a lossless 2:1
compression, and TLC, Speedvision and Outdoor Life use DBETA with a similar
2:1 compression. As for terrestrial broadcasters, WWOR, Maryland and Ohio
Public TV use DBETA, WTIC uses D2, and WPIX uses D3.

So what if HDTV uses the spectrum more efficiently than analog NTSC? If you
were to watch an NTSC channel on a storage spectrum analyser (only seen one
in my life) you would notice that the spectrum does fill up much like a
digital channel as the pictures sent via the NTSC channel vary with Average
Picture Level and frequency content, over time. So what if there are no
coherent sidebands, do we care?

As for an estimate of $3500 for a digital TV at NAB this year, how can this
be, NAB isnt over yet. Last estimate I got, was in the neighborhood of
$1500, several years ago when the big 7 were competing to be THE standard.
You of course realize that this price will drop as manufacturing volume
increases, much like cellular phones, VCRs and Microwaves did after they
were introduced.

Yes, HDTV will take MANY years to implement. Did you realize that Great
Britian took 20 years to change from the 400 line monochrome to the 625
color standard? There will be alot of simulcasting taking place during the
implementation period.

There certainly IS a visual improvement over NTSC. I once saw a
demonstration of the DigiCipher HDTV standard side by side with NTSC. The
HDTV picture was comparable with 35MM film while NTSC was its usual grainy
self. I dont have the specs in front of me, but I'll take 1000 odd lines
over 525 any day, and vertical lines of resolution are similarly higher.

Line doubling?????? What is that??? Erasing the scan lines?? wouldnt that
LOWER the resolution even more? I am confused here. In my years as a
broadcast engineer, I have NEVER heard of this term.

Write it up and it will be published, hopefully in a reputable magazine that
is professionally laid out, proofread and spellchecked. Not a ransom note
between two glossy covers.

--
****
** Ronald C. Barnes KA1KJZ   Engineering Tech, Group W Satellite **
** 1591 W. Broad Street   ARRL CT Section Technical Coord.   **
** Stratford, CT 06497   Member, Soc. Broadcast Engineers   **
**   **
** The preceding was brought to you by Ouchies (tm)   **
** The prickly toy you bathe with   **
****

52. Re: [SS:211] Re: SS for position

From: Sean Warren-Cox (SWC) <seanw@hpqs0212.sqf.hp.com>
Date: Fri, 19 Apr 1996 7:57:59 BST
To: ss@tapr.org
Message-ID: <199604190657.AA103247079@hpqs0212.sqf.hp.com>
Rendered body type: text/plain

Hi Gerry,

forgive my ignorance but I believe that satelite coverage requires line of
sight with the sky and I want to measure positions within a building. Also
I want to measure to within 1cm and this cannot be done with GPS without
using P-code which is restricted for military use.
So the only solution I can think of is to build my own satellite transmitters
and receivers that with work within a building through solid walls.
Multipath I agree is still going to be a problem.

>
> I guess I'm a little baffled. Where do you not have good satellite coverage,
> but where you think you could do RF-based positioning without multipath?
>
> The overhead angles for GPS work are not very restrictive.
>
> 73, gerry
> n5jxs@tamu.edu
>
>

--
____

          Sean Warren-Cox | sean@hpiplaa.sqf.hp.com
          TSD direct line | tel: 0131 331 7080
____

53. Re: [SS:214] Re: SS for position

From: Greg Jones <wd5ivd@tapr.org>
Date: Fri, 19 Apr 1996 03:56:04 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199604190856.DAA11600@tapr.org>
Rendered body type: text/plain

Steve Bible - who is on this list has co-authored a paper with one of his
past profs at the Naval Post Graduate School concerning accurate positioning
of this type with a small area. Not sure about a building, but remembert
having a very smiliar dicussion with Steve on the possibility of simulating
things in order to generate virtully maped spaces. This was all using SS.

Steve just moved from CT to the south part of the US and is getting setteled
in -- with luck he will post something and clear up my all but cluttered
memory.

Cheers - Greg, WD5IVD

>
> Hi Gerry,
>
> forgive my ignorance but I believe that satelite coverage requires line of
> sight with the sky and I want to measure positions within a building. Also

> I want to measure to within 1cm and this cannot be done with GPS without
> using P-code which is restricted for military use.
> So the only solution I can think of is to build my own satellite transmitters
> and receivers that with work within a building through solid walls.
> Multipath I agree is still going to be a problem.
>
> >
> > I guess I'm a little baffled. Where do you not have good satellite coverage,
> > but where you think you could do RF-based positioning without multipath?
> >
> > The overhead angles for GPS work are not very restrictive.
> >
> > 73, gerry
> > n5jxs@tamu.edu
> >
> >
>
>
> --
> ____
>
>   Sean Warren-Cox | sean@hpiplaa.sqf.hp.com
>   TSD direct line | tel: 0131 331 7080
> ____
>
>

54. Re: [SS:214] Re: SS for position

From: Per-Tore Aasestrand <c-three@telepost.no>
Date: Fri, 19 Apr 1996 12:55:44 +0200
To: ss@tapr.org
Message-ID: <199604191055.2795.telepost.no@telepost.no>
Rendered body type: text/plain

At 02:03 19.04.96 -0500, Sean Warren-Cox <sean@hpiplaa.sqf.hp.com> wrote:

>Hi Gerry,
>
>forgive my ignorance but I believe that satelite coverage requires line of
>sight with the sky and I want to measure positions within a building. Also
>I want to measure to within 1cm and this cannot be done with GPS without
>using P-code which is restricted for military use.
>So the only solution I can think of is to build my own satellite transmitters
>and receivers that with work within a building through solid walls.
>Multipath I agree is still going to be a problem.

The precision for the military code will be in the order of several meters!
Applying differential techniques, this can be improved to within 30-50 cm.

Since the radiowaves propagates at 30 cm/ns, 1 cm location precision would
require a timing resolution of appr. 0.3 ns! Using DS-SS, you would use the
chips as "markers", and you would measure the time delay between the chips
received form the different "beacons" (or sattelites).
Multipath will be a serious problem. What about the propagation properties
of the different building materials? Will this have a significant influence
on the absolute time delays?

Interesting project, thou!

Regards,

Per-Tore
LA7NO

----------------------------------+--------------------------------
Per-Tore Aasestrand	E-mail : c-three@telepost.no
C-Three Systems AS	Fax : + 47 - 55 23 18 88
P.O. Box 1708	Voice : + 47 - 55 32 67 67
N-5024 Bergen, Norway	Mobile : + 47 - 92 04 44 76
----------------------------------+--------------------------------

55. Re: [SS:214] Re: SS for position

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Fri, 19 Apr 1996 11:22:57 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199604191622.LAA12924@solar.cs.tamu.edu>
Rendered body type: text/plain

Sean Warren-Cox sez:
>
> forgive my ignorance but I believe that satelite coverage requires line of
> sight with the sky and I want to measure positions within a building. Also
> I want to measure to within 1cm and this cannot be done with GPS without
> using P-code which is restricted for military use.
> So the only solution I can think of is to build my own satellite transmitters
> and receivers that with work within a building through solid walls.
> Multipath I agree is still going to be a problem.

You are, of couorse, correct: You have to see the sky to get GPS coverage.
Off hand, I suspect your best option is transponder-triangulation: Ping the
position transponder with 3-4 fixed beacons and derive the position info from
that. Then, you're just reducing it to timing.

73, gerry

56. Re: [SS:213] Re: File your comments in RM-8737!

From: ATVQ@aol.com
Date: Fri, 19 Apr 1996 12:24:04 -0400
To: ss@tapr.org
Message-ID: <960419122402_473561898@emout08.mail.aol.com>
Rendered body type: text/plain

Shows what you dont know. I have been at every HDTV demo/test. So I think I
know a lot more about it than you. Also NAB is OVER, I was there too.
1. Digital is not "proven" as you claim. It is USED, because it offers some
things in RECORDING that are not available in analog land. It is not used in
TRANSMISSION. as yet anyway, except for compressed (digitally reduced)
satellite form such as athe Scientific Atlanta system. Which, if you move
the camera diagionally, you will see large sections of the pictures (blocks)
move in steps, not smoothly as in analog land. So there are still artifacts.

2. Digital recording relies on emense bnadwidth to accomodate 4,4,4 or
4,2,2, or 4,1,1 sampling and bit stream. Also some data compression schemes
have such complex math to produce look ahead and fill frames that the cost is
currently prohibitive. At the 1996 NAB, Zenith and Sony both stated that
digital TV's in mass production would start at $3500.

3. I use digital at my TV station too. And not some cluge "digital" tape
machine boxes, but dull digital, stays in the computer, no tape format of
Avid, including the digital fiber link ATM switching. It goes from my cameras
intothe computer, gets massaged in the computer and then transmitted into the
air as an NTSC encoded signal. No one in the country is more digital than my
station and even my news trucks are full digital.

4. Most of the top 40 ADI stations DO NOT use digital. Even the networks
still use analog tape. There is some digital equipment in PRODUCTION/EDIT
suites, but escept for those of us with Avid Airplay or similar devices,
there is no DIGITAL on-line playback in mass quantities. So you are wrong
there. Locally, Channel 2 (CBS) uses analog, 5 (NBC) uses MII analog, 7
(ABC) uses Betacart analog. 9, WGN) uses MII and is converting to beta tape.
 11 (PBS) uses 1", and beta. 20 (PBS) uses 3/4" U-matic, 26 WCIU) uses 3/4"
and some 1/2". 32 (FOX) uses Betacart, 38 uses Avid Airplay, and 3/4". 44
uses Airplay and beta /airplay for news, 50 uses 3/4", 56 uses 3/4", 60 uses
3/4" and beta, 62 uses 3/4", and 66 uses a Betacart.   Only two DIGITAL out
of 15 stations.

5. HBO and others who use digital on KU band for direct TV, are converting
the signal from a received C band ANALOG signal. It is uplinked from HBO on
Long Island, downlinked in Colorado, coonverted to compressed digital for Ku.
 There is no such think as lossless compression, 2:1 or 50:1 you always lose
something. Read teh Snell and Wilcox book, or the Intelsat Digital Satellite
book.

6. You are dead wrong on the build up of sidebands on analog NTSC. Unless
you transmit a sweep signal, or white noise, the sidebands decrease at a rate
of 30 db/MHz initially, and 15 dB/Mhz after that for any televised scene.
 Using a time lapse/storage scope, which shows a peak hold, you will always
achieve a curve showing the distribution of the sideband energy. That curve
is always decreasing with frequency.   The digital spectrum is FLAT across
the entire 6 MHz except for a spike for the pilot tone. So do you want to
comp[ete with a sideband that is - 50dBc or continous noise at -12 dBc?

7. The only uncompressed thus lossless digital format is D1, which records
in the 4, 4, 4 format. Considering that you cannot get a SINx/X pulse
through it nearly as well as you can in an old 2" AVR-1 analog quad machine,
I would say it still has loss!
D2 is a composit ANALOG signal, digitized and bit reduced and is not a

DIGITAL recording system. It does not take in 0's and 1's and spit out 0's and 1's, it takes in composit analog NTSC and spits out composoit analog NTSC. Go read up on your "digitized" recording formats. It is NOT digital because the box or name plate says it is digital.

8. NTSC is not "grainy" unless the source is grainy. Even 35 mm film has grain noise.   So look. There is no difference in the S/N ratio of HDTV and NTSC at the source. In transmission the analog signal S/N ratio decreases with distance in a gradual manner. Transmission/reception standards are such that a "noiseless" picture is 60 dB S/N. There is noise there, it is not visible tothe naked eye. For video tape and Cable TV figures in the 40 dB-45 dB range are considered acceptable noise levels.   At 30 dB there is noise which mnost people will see easily. The HDTV digital signal will have an increase in BER (bit error rate) which is masked by processing. Then the picture degrades to nothing in about 2 dB change of S/N ratio at the BER threshold.   BER covers the noise, but subtracts from the accuracy of the picture in error correction porportional to the increase in BER.

9. Film is usually regarded as 2000 line resolution equivelent. Line doubling (a common term in digital TV) is a cheap way of doubling the number of scan lines on the screen, thus making the individual lines harder to see because they optically blend together. The vertical scan rate is doubled and the same picture is presented twice in the same amount of time. It does not add resolution. With 525 (242.5) you can see individual scan lines and the bigger the screen, the bigger the space between the scan lines, so you fill in the spaces with duplicate lines. Because of aperature effect in the display device (CRT or whatever) and the optical limitation of your eyes, the scan lines blend together and "disapear".

10. Horizontal resolution is only slightly better in HDTV than NTSC because the scan line is longer. Thus each pixel must cover more real space (or time) in HDTV, or you must increase the number of pixels per line to compensate for the longer line. Since the screen (CRT) is the same width for HDTV and NTSC in TIME, the increased numnber of pixels per line simply compensates for the physically wider screen.

11. You cant put your digital equipment on a kite,m R/C plane, small boat, ultralight, car, plane or other portable/mobile operation without considerable vost in money, battery life or physical weight. Analog wins the weight/battery/size contest every time. It wins the $$ contest every time too.

So go back to your books and read up on the differences between recording and transmission and between digitized alanog and DIGITAL. Then spout off when you have the right answers. So far you are batting zero.

57. Re: File your comments in RM-8737!

From: "Ronald C. Barnes" <ka1kjz@tigger.jvnc.net>
Date: Fri, 19 Apr 1996 20:52:24 -0400
To: ss@tapr.org
Cc: ss@tapr.org
Message-ID: <199604200052.AA21159@tigger.jvnc.net>
Rendered body type: text/plain

At 11:39 AM 4/19/96 -0500, ATVQ@aol.com wrote:
>Shows what you dont know. I have been at every HDTV demo/test. So I think I
>know a lot more about it than you. Also NAB is OVER, I was there too.
>1. Digital is not "proven" as you claim. It is USED, because it offers some
>things in RECORDING that are not available in analog land. It is not used in
>TRANSMISSION. as yet anyway, except for compressed (digitally reduced)
>satellite form such as athe Scientific Atlanta system. Which, if you move
>the camera diagionally, you will see large sections of the pictures (blocks)
>move in steps, not smoothly as in analog land. So there are still artifacts.
>

Repeat after me.... DIGITALLY COMPRESSED, MPEG-2 VIDEO IS USED ON A DAILY BASIS BY THE MAJOR BROADCASTERS FOR SATELLITE DISTRIBUTION. Perhaps you have heard the term.. "General Instruments Video Cipher II".

>2. Digital recording relies on emense bnadwidth to accomodate 4,4,4 or
>4,2,2, or 4,1,1 sampling and bit stream. Also some data compression schemes
>have such complex math to produce look ahead and fill frames that the cost is
>currently prohibitive. At the 1996 NAB, Zenith and Sony both stated that
>digital TV's in mass production would start at $3500.
>

For now.... how much did the first color sets cost? You'll have to look at it as a percentage of per capita income, as the dollar was valued

differently back then. I remember my parents saying, "only the rich had
color TV in the 50's".

>3. I use digital at my TV station too. And not some cluge "digital" tape
>machine boxes, but dull digital, stays in the computer, no tape format of
>Avid, including the digital fiber link ATM switching. It goes from my cameras
>intothe computer, gets massaged in the computer and then transmitted into the
>air as an NTSC encoded signal. No one in the country is more digital than my
>station and even my news trucks are full digital.
>

Having an Avid does NOT constitute being fully digital. Perhaps you've seen
in the trades the new Asia Broadcast Center in Singapore, a partnership of
Group W and Yarra Films. Fully SDI, the only analog boxes are the Odetics
TCS-90's, but they run DBETA with analog outs.

We have 3 Avids, and two fully digital edit suites with embedded SDI audio.
Beginning next month (once the switcher the boss bought at NAB arrives)
construction of the fully digital studio will commence.

So dont say no one is more digital than you.

>4. Most of the top 40 ADI stations DO NOT use digital. Even the networks
>still use analog tape. There is some digital equipment in PRODUCTION/EDIT
>suites, but escept for those of us with Avid Airplay or similar devices,
>there is no DIGITAL on-line playback in mass quantities. So you are wrong
>there. Locally, Channel 2 (CBS) uses analog, 5 (NBC) uses MII analog, 7
>(ABC) uses Betacart analog. 9, WGN) uses MII and is converting to beta tape.
> 11 (PBS) uses 1", and beta. 20 (PBS) uses 3/4" U-matic, 26 WCIU) uses 3/4"
>and some 1/2". 32 (FOX) uses Betacart, 38 uses Avid Airplay, and 3/4". 44
>uses Airplay and beta /airplay for news, 50 uses 3/4", 56 uses 3/4", 60 uses
>3/4" and beta, 62 uses 3/4", and 66 uses a Betacart.   Only two DIGITAL out
>of 15 stations.
>

I cant speak for Chicago, but NYC, Hartford/NewHaven, LA, and Boston, hell
most of the stations have some sort of digital machines, either for editing,
or on air playback. And, as I mentioned before, WWOR uses all DBETA in
playback, WPIX uses all D-3 for on-air playback. And as for on online
digital playback?!?!? Well, I must be hallucinating when I clean the DBETA
machines in TLC, Speedvision and Outdoor Life. Also that Tektronix Profile
in The History channel and on Continuous Hits 4 must be a figment of my
imagination. At the VR disk recorder on Discovery West's delay must also be
unnecessary.

>5. HBO and others who use digital on KU band for direct TV, are converting
>the signal from a received C band ANALOG signal. It is uplinked from HBO on
>Long Island, downlinked in Colorado, coonverted to compressed digital for Ku.
> There is no such think as lossless compression, 2:1 or 50:1 you always lose
>something. Read teh Snell and Wilcox book, or the Intelsat Digital Satellite
>book.
>

Repeat after me... ALL HBO SERVICES ARE DISTRIBUTED TO THE CABLE HEADEND AS
DIGICIPHER II. I mean that, C band, 6 channels per transponder, all
digital. Yes DirecTV does downlink it, from C-band, as DG-II, re-encodes it
to thier subset of MPEG-II and re transmits it on the DBS band. If thats
not true, and cable networks are still analog, I can throw away the two
Digicipher boxes we have? I guess they arent needed.

Speedvision and Outdoor Life are also on C-band as DG-II, Speed is uplinked
by us, and OLC is uplinked by HBO on one of their spare DG-II channels, also
on C-band.

>6. You are dead wrong on the build up of sidebands on analog NTSC. Unless
>you transmit a sweep signal, or white noise, the sidebands decrease at a rate
>of 30 db/MHz initially, and 15 dB/Mhz after that for any televised scene.
> Using a time lapse/storage scope, which shows a peak hold, you will always
>achieve a curve showing the distribution of the sideband energy. That curve
>is always decreasing with frequency.   The digital spectrum is FLAT across
>the entire 6 MHz except for a spike for the pilot tone. So do you want to
>comp[ete with a sideband that is - 50dBc or continous noise at -12 dBc?
>

Who's competing with what here? SO WHAT IF IT LOOKS LIKE NOISE! The only
people on HDTV channels will be HDTV broadcasters. Lets not go into NTSC to
HDTV implementation periods and all that, when the dust settles, the only

thing in the TV band will be TV stations, like it always has been, always
will be, who cares WHAT it is.

>7. The only uncompressed thus lossless digital format is D1, which records
>in the 4, 4, 4 format. Considering that you cannot get a SINx/X pulse
>through it nearly as well as you can in an old 2" AVR-1 analog quad machine,
>I would say it still has loss!
>D2 is a composit ANALOG signal, digitized and bit reduced and is not a
>DIGITAL recording system. It does not take in 0's and 1's and spit out 0's
>and 1's, it takes in composit analog NTSC and spits out composoit analog
>NTSC. Go read up on your "digitized" recording formats. It is NOT digital
>because the box or name plate says it is digital.
>

Uhhhhh, D1 is 4:2:2. I'll have to read the book on the D2's, but I KNOW FOR
A FACT! That DBETA is fully digital, 4:2:2 component serial digital. You
can split hairs and say that ANYTHING layed on a tape is analog, in the case
of digital, either alot of something or nothing (1's and 0's). But... on
the D2's, whats the parallel digital interface for? Decoration? In my
experience with the Ampex 300's, the analog spigots were just that, to
interface with the rest of the world. Everything else in the box is
digital, even on tape. Just because it has an analog spigot on the back
doesnt make it "not digital".

>8. NTSC is not "grainy" unless the source is grainy. Even 35 mm film has
>grain noise.   So look. There is no difference in the S/N ratio of HDTV and
>NTSC at the source. In transmission the analog signal S/N ratio decreases
>with distance in a gradual manner. Transmission/reception standards are such
>that a "noiseless" picture is 60 dB S/N. There is noise there, it is not
>visible tothe naked eye. For video tape and Cable TV figures in the 40
>dB-45 dB range are considered acceptable noise levels.   At 30 dB there is
>noise which mnost people will see easily. The HDTV digital signal will have
>an increase in BER (bit error rate) which is masked by processing. Then the
>picture degrades to nothing in about 2 dB change of S/N ratio at the BER
>threshold.   BER covers the noise, but subtracts from the accuracy of the
>picture in error correction porportional to the increase in BER.
>

In a consumer driven market such as television, do you really think that
John and Jane Q Public really CARE about the s/n ratio and BER? They want
to sit down and watch a perfect, noiseless picture that HDTV will provide,
along with all the "extras" that have been figured into the standard. I'll
take motion artifacts and concealment any day over 2 channels of really poor
audio and a HORRIBLE picture. Yes NTSC is a terrible picture, I have to
laugh at TV sets that use slot-mask tubes (ie Trinitron) to conceal the
problems with the picture. A great thing about digital TV is the fact that
it either works or it doesnt.

>9. Film is usually regarded as 2000 line resolution equivelent. Line
>doubling (a common term in digital TV) is a cheap way of doubling the
>number of scan lines on the screen, thus making the individual lines harder
>to see because they optically blend together. The vertical scan rate is
>doubled and the same picture is presented twice in the same amount of time.
> It does not add resolution. With 525 (242.5) you can see individual scan
>lines and the bigger the screen, the bigger the space between the scan lines,
>so you fill in the spaces with duplicate lines. Because of aperature effect
>in the display device (CRT or whatever) and the optical limitation of your
>eyes, the scan lines blend together and "disapear".
>

See my rantings about slot-mask, about the same thing as what you describe.

>10. Horizontal resolution is only slightly better in HDTV than NTSC because
>the scan line is longer. Thus each pixel must cover more real space (or
>time) in HDTV, or you must increase the number of pixels per line to
>compensate for the longer line. Since the screen (CRT) is the same width for
>HDTV and NTSC in TIME, the increased numnber of pixels per line simply
>compensates for the physically wider screen.
>

Again, SO?

>11. You cant put your digital equipment on a kite,m R/C plane, small boat,
>ultralight, car, plane or other portable/mobile operation without
>considerable vost in money, battery life or physical weight. Analog wins the
>weight/battery/size contest every time. It wins the $$ contest every time
>too.

>

For now. You couldnt do that (practically) with analog NTSC either until the late 80's. Yes, digital is big, bulky and expensive, for now. I really cant imagine John Q. Ham hanging a camera, transmitter, etc on a kite back in the 50's (or the 60's and 70's for that matter) when NTSC first came out. Granted the digital chipsets are kind of pricy, for now, $1500 for an MPEG-2 encoder, and around $100 for a decoder. The encoders are more expensive probably because they dont sell too many of them, YET.

And, have you seen the DVC-pro gear from Sony and Panasonic? About the same size as my 8mm Sony Handycam. So, give it time, digital will become practical very shortly. I imagine there were similar discussions in 1953 when we were about to go from monochrome to NTSC color. I'm sure similarly short minded engineers thought it would be the death of television itself. But if it werent for color, we wouldnt have jobs, as a monochrome signal can be maintained by just about anyone. And that I think is the root cause of the HDTV / Digital video debate. A digital signal can be spec'd, installed, maintained and measured by anyone. Just hook it up and go. (dont even think of going off about crimped cables).

And yes, our jobs are also threatened by the complexity of digital. Things are rapidly becoming a "black box" technology. No more component level troubleshooting, just replace the board, and any monkey can do that. But the same can be said of automobiles, they too are becoming black box. How many backyard mechanics are comfortable inside their nice new 1996 fuel injected, airbagged, ABS equipped wonder buggies!

Yes digital TV / HDTV will kill off the engineer with the garage mechanic mentality, leaving only the best and brightest ones who kept up with the everchanging technology and embraced it as it arrived.

>So go back to your books and read up on the differences between recording and
>transmission and between digitized alanog and DIGITAL. Then spout off when
>you have the right answers. So far you are batting zero.
>

Well I do have the right answers. I work for TWELVE major cable networks, with full post production, marketing and sales support. Look it up in the book, Group W Network Services, and check the trade publications, there's usually an article or two about us in each issue.

--
****
** Ronald C. Barnes KA1KJZ   Engineering Tech, Group W Satellite **
** 1591 W. Broad Street   ARRL CT Section Technical Coord.   **
** Stratford, CT 06497   Member, Soc. Broadcast Engineers   **
**   **
** The preceding are my opinions, mine, mine, mine!   **
** Any attempt to say otherwise will result in a hearty laugh   **
****

58. Re: [SS:219] Re: File your comments in RM-8737!

From: Greg Jones <wd5ivd@tapr.org>
Date: Fri, 19 Apr 1996 21:18:34 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199604200218.VAA17143@tapr.org>
Rendered body type: text/plain

All very interesting reading about NTSC and HDTV stuff.

However -- we seem to have left the SS topic flow that was at the beginning.

Bandwidth is bandwidth. If we can provide something that pumps a lot of bits and does not interfer with exsiting services, then I think we will find a lot of things that people we want to run over it that we can't think of now.

Cheers - Greg, WD5IVD

59. Re: [SS:219] Re: File your comments in RM-8737!

From: Jeffrey Austen <JRA1854@tntech.edu>
Date: Fri, 19 Apr 1996 22:05:27 -0500 (CDT)
To: ss@tapr.org
Message-ID: <01I3QP3RZ0GYQULNHS@tntech.edu>
Rendered body type: text/plain

> >Shows what you dont know. I have been at every HDTV demo/test. So I think I
[cut]
> Repeat after me.... DIGITALLY COMPRESSED, MPEG-2 VIDEO IS USED ON A DAILY
[cut]

How does this relate to Spread-Spectrum?

Jeff, k9ja

60. Re: SS for position

From: Per-Tore Aasestrand <c-three@telepost.no>
Date: Sat, 20 Apr 1996 10:18:17 +0200
To: ss@tapr.org
Message-ID: <199604200818.12310.telepost.no@telepost.no>
Rendered body type: text/plain

At 15:20 19.04.96 BST, Sean wrote:
>Hello Per-Tore,
>
>Thanks for you original lead I am moving forward at last.
>Do you know of any applications where this degree of timing resolution
>has been used ?

Yes! I would look closely to developments at the Lawrence Livermore National
Laboratory with respect to what they call "Micropower Impulse Radar" (MIR).
This is one of the more interesting new approaches I've seen in a long time.
The results they've demonstrated are just amazing (for me at least)! There
is a lot of information on this available on their web-site. Go to
http://www.llnl.gov, and look for MIR. You will even find references to
several applications that are in some way related to your own.

>I thought spread spectrum systems were less subject to multipath because
>the reflected signal is delayed compared with the direct signal path and
>it is treated as any other uncorrelated input. The higher the chip rate
>the smaller the multipath problem.

I think this is basically correct. MIR is, in my opinion, just another form
of SS modulation. They send a stream of narrow pulses with a high PRF. The
PRF is in turn modulated by some sort of Gaussian noise. The emission
bandwidth can be very high.

>I still do not know where to start in trying to build a test system. Do
>you know of any articles on test projects ?

Good luck with your project, and keep me posted on your advances!

Regards,

Per-Tore
LA7NO

----------------------------------+--------------------------------
Per-Tore Aasestrand	E-mail : c-three@telepost.no
C-Three Systems AS	Fax : + 47 - 55 23 18 88
P.O. Box 1708	Voice : + 47 - 55 32 67 67
N-5024 Bergen, Norway	Mobile : + 47 - 92 04 44 76
----------------------------------+--------------------------------

61. Re: [SS:219] Re: File your comments in RM-8737!

From: Dirk-Jan Koopman <djk@dirku.demon.co.uk>
Date: Sat, 20 Apr 1996 12:39:32 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960420123827.32090G-100000@dirku.demon.co.uk>
Rendered body type: text/plain

On Fri, 19 Apr 1996, Ronald C. Barnes wrote:

> At 11:39 AM 4/19/96 -0500, ATVQ@aol.com wrote:
> >Shows what you dont know. I have been at every HDTV demo/test. So I think I
> >know a lot more about it than you. Also NAB is OVER, I was there too.
> >1. Digital is not "proven" as you claim. It is USED, because it offers some
> >things in RECORDING that are not available in analog land. It is not used in
> >TRANSMISSION. as yet anyway, except for compressed (digitally reduced)
> >satellite form such as athe Scientific Atlanta system. Which, if you move
> >the camera diagionally, you will see large sections of the pictures (blocks)
> >move in steps, not smoothly as in analog land. So there are still artifacts.
> >
>

> Repeat after me.... DIGITALLY COMPRESSED, MPEG-2 VIDEO IS USED ON A DAILY
> BASIS BY THE MAJOR BROADCASTERS FOR SATELLITE DISTRIBUTION. Perhaps you
> have heard the term.. "General Instruments Video Cipher II".
>

etc...

This discussion is quite interesting, but perhaps you could continue it
elsewhere - please.

62. Re: File your comments in RM-8737!

From: "Ronald C. Barnes" <ka1kjz@tigger.jvnc.net>
Date: Sat, 20 Apr 1996 16:38:18 -0400
To: ss@tapr.org
Cc: ss@tapr.org
Message-ID: <199604202038.AA16712@tigger.jvnc.net>
Rendered body type: text/plain

At 10:16 PM 4/19/96 -0500, Jeffrey Austen wrote:
>> >Shows what you dont know. I have been at every HDTV demo/test. So I think I
>[cut]
>> Repeat after me.... DIGITALLY COMPRESSED, MPEG-2 VIDEO IS USED ON A DAILY
>[cut]
>
>How does this relate to Spread-Spectrum?
>
>Jeff, k9ja
>

You're right, absolutely nothing. But the question begs to be asked
however, what does filing comments on the FCC RM for HTDV have to do with it
too?

At least you got some entertainment for an otherwise slow list.

Ron :)

--
****
** Ronald C. Barnes KA1KJZ   Engineering Tech, Group W Satellite **
** 1591 W. Broad Street   ARRL CT Section Technical Coord.   **
** Stratford, CT 06497   Member, Soc. Broadcast Engineers   **
**   **
** The preceding are my opinions, mine, mine, mine!   **
** Any attempt to say otherwise will result in a hearty laugh   **
****

63. Spread Spectrum Chipset

From: "Ronald C. Barnes" <ka1kjz@tigger.jvnc.net>
Date: Sat, 20 Apr 1996 16:38:21 -0400
To: SS@tapr.org
Message-ID: <199604202038.AA16717@tigger.jvnc.net>
Rendered body type: text/plain

Hello pholx...

I was poking aroung on the Maxim Semiconductor web site
<http://www.mxim.com/> yesterday and came across this little gem...

MAX2402
800MHZ to 1000MHz Transmitter

The MAX2402 transmitter integrates a double-balanced mixer, buffered local
oscillator (LO) port, variable gain stage, and power amplifier into a single
IC. It is intend-ed for use in the 800MHz to 1000MHz band, and is compatible
with both direct-sequence and frequency-hopping spread-spectrum designs in
the 902MHz to 928MHz ISM band.

In a typical application, a digital baseband signal is mixed with a local
oscillator signal to yield a BPSK-modulated carrier at the antenna.
Alternatively, the baseband input may be grounded and an FSK-modu-lated LO
signal applied directly to the LO port. The LO port consists of a limiting
amplifier that can accept a single-ended or differential signal with input
power between -6dBm and +6dBm in the frequency range of 800MHz to 1000MHz.
The baseband modulation input is linear over a 2V range, and limits with
larger signal levels within the supply range. The double-balanced mixer has
been optimized for high carrier rejection. The variable gain stage offers
typically 40dB of adjustment range. The power amplifier provides more than
20dBm output power and has a bias adjustment, which allows adjustment of

efficiency and harmonic distortion.
A shutdown function reduces the current draw to less than 2µA in less than
10µs. The MAX2402 comes in a 20-pin SSOP package to minimize board area.

APPLICATIONS

Direct-Sequence Spread-Spectrum Transmitter
Frequency-Hopping Spread-Spectrum Transmitter
FSK, GMSK, BPSK, and ASK Digital Transmitter
AM and FM Analog Transmitter © Low-Cost, Flexible Transmitter

FEATURES:

More than 100mW of Output Power into 50½
Operates from 800MHz to 1000MHz
Single +5V Supply
20-Pin SSOP Package
Uses Less than 2µA in Power-Down
More than 35dB of Power Adjustment Range
LO Input Power Range from -6dBm to +6dBm
2V Linear Range on Modulation Input

I dont have pricing or availability, but I will pass that along to y'all
after I talk to them Monday.

Looks interesting.

Ron :)
--
****
** Ronald C. Barnes KA1KJZ   Engineering Tech, Group W Satellite **
** 1591 W. Broad Street   ARRL CT Section Technical Coord.   **
** Stratford, CT 06497   Member, Soc. Broadcast Engineers   **
**   **
** The preceding are my opinions, mine, mine, mine!   **
** Any attempt to say otherwise will result in a hearty laugh   **
****

64. TCM

From: RICARDO DENIS <103130.1467@CompuServe.COM>
Date: 20 Apr 96 18:15:42 EDT
To: all <ss@tapr.org>
Message-ID: <960420221541_103130.1467_JHG117-1@CompuServe.COM>
Rendered body type: text/plain

Hello All,

My name is Rick (HR2KOS) and I live in Honduras. I'm interested in any and all
areas of amateur radio that are at the forefront of technology, even if i don't
understand them completely. SS is certainly one of them so I decided to learn
more by joining this discussion group (and TAPR soon).
The other day I bought a new modem for my computer and in the manual it says
that it uses "Tellis Code Modulation". Can anyone tell this layman (layham) what
"TCM" is or how it works, and if it can be applied to ham radio? Maybe you could
suggest a book. Any replies/info are deeply appreciated. tnx 73,

Rick
HR2KOS

65. Re: [SS:221] Re: File your comments in RM-8737!

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sun, 21 Apr 1996 04:45:56 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199604210445.EAA00530@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

> How does this relate to Spread-Spectrum?

I agree that this isn't the place for a lengthy debate on the merits of
analog vs digital TV, but before this little tangent draws to a close,
I'd like to toss in some comments that do relate to spread spectrum.

Henry claims that conversion from analog to digital TV would be
enormously expensive - for one thing, receivers cost something like
$3500. He's right, no doubt... but only in the context of professional
broadcasting. Let's try and look at a more relevant context:

transmission of digital video by radio amateurs. He equates digital video with HDTV, and then uses that to show that it would be far too expensive for amateurs to convert from analog TV to digital. This is somewhat analogous to saying that it would be impractical to convert from horse and buggies to automobiles because Ferraris are too expensive. HDTV is at the extreme end of a wide range of digital video techniques that range all the way down to videoconferencing systems which can do a passable job of transmitting full-motion video at landline and medium-speed packet bit rates (19.2-56 kbps). Obviously, you trade off quality (resolution, frame rate, color depth, etc) to get to the low end, but the fact remains that remarkably useful video links can be set up which use two orders of magnitude less bandwidth than an NTSC signal. And quality improves rapidly as you increase the bit rate.

Hams are supposed to be communicators, not broadcasters. They do not need to follow the practices of the broadcast industry. Radio broadcasters still use AM, but despite AM's superior audio quality, hams (except for a few diehards) have switched to SSB, since it's a more efficient and robust method to transmit voice signals. I think a similar transition should be taking place from NTSC TV to digital video in the ham bands. Consider the fact that a single ATV user transmitting in the 70cm band is monopolizing 30% of a prime band (in Canada, or parts of the US, where only 430-450 MHz is available), using a modulation technique which is more than half a century old, and which is totally intolerant of spectrum sharing. Consider how many users could be transmitting digital video at say 56 kbps in that bandwidth, using either narrowband packet or spread spectrum (using CDMA and the superior spectrum reuse properties of digital signalling). Consider the ease with which those users could internetwork over long distances via a variety of media. You get the picture (pun intended!)...

I seriously doubt whether many amateur video applications require broadcast-quality video - again, we're not broadcasters! The main reason that analog video continues to prevail on the ham bands has to be cost - NTSC equipment is ubiquitous and relatively inexpensive. I think a couple of things have to happen to kickstart the transition to digital:

1) The ATV folks have to break away from the notion that video has to be equivalent in quality to broadcast NTSC for them to do their thing (whatever that is), and to start to appreciate the advantages of digital video transmission.

2) Packet systems operating at 56 kbps and up have to become more available and affordable. 56k is still on the rise, but the real promise for bit rates of this order and more is in spread spectrum. You could do impressive digital video with some of the ISM band SS modems, but we really need a homegrown amateur SS modem that's cheaper and has more processing gain than most of the ISM stuff.

As for other digital video equipment, most hams already have PCs with monitors which are superior to NTSC resolution, and with combination camera/video capture devices under $100 at the low end, this stuff is becoming more affordable all the time. I'll grant that digital video isn't going to take over applications like balloon-launched ATV anytime soon, but it should start making inroads in other areas, and the sooner, the better.

Not trying to be argumentative, just stating my humble opinion...

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

66. RE: 218] Re: File your comments in RM-8737!

From: David Stirrup <daves@aquasoft.com.au>
Date: Sun, 21 Apr 1996 16:50:52 +-1000
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <01BB2FA3.2D7D9440@syd-ts1-214.tpgi.com.au>
Rendered body type: text/plain

Can someone please help my confusion,

I have been following this thread a while and I am trying to determine it's relevance to Spread Spectrum and not ATV.

Is it that I have missed the beginning message?? I take it that the

intended original issue was the bandwidth requirements to transmit digital video using SS techniques.

I expect that I also missed the part about how you can have many simultaneous transmissions using the same bandwidth but on a different PN sequence.

How analog became involved in a digital only mode discussion I am puzzled by.

Please help illuminate my ignorance. I am sure there are others who share my confusion.

Dave Stirrup
VK2XDS

From: ATVQ@aol.com[SMTP:ATVQ@aol.com]
Sent: Friday, 19 April 1996 21:39
To: ss@tapr.org
Subject: [SS:218] Re: File your comments in RM-8737!

Shows what you dont know. I have been at every HDTV demo/test. So I think I know a lot more about it than you. Also NAB is OVER, I was there too.
1. Digital is not "proven" as you claim. It is USED, because it offers some things in RECORDING that are not available in analog land. It is not used in TRANSMISSION. as yet anyway, except for compressed (digitally reduced) satellite form such as athe Scientific Atlanta system. Which, if you move the camera diagionally, you will see large sections of the pictures (blocks) move in steps, not smoothly as in analog land. So there are still artifacts.

2. Digital recording relies on emense bnadwidth to accomodate 4,4,4 or 4,2,2, or 4,1,1 sampling and bit stream. Also some data compression schemes have such complex math to produce look ahead and fill frames that the cost is currently prohibitive. At the 1996 NAB, Zenith and Sony both stated that digital TV's in mass production would start at $3500.

3. I use digital at my TV station too. And not some cluge "digital" tape machine boxes, but dull digital, stays in the computer, no tape format of Avid, including the digital fiber link ATM switching. It goes from my cameras intothe computer, gets massaged in the computer and then transmitted into the air as an NTSC encoded signal. No one in the country is more digital than my station and even my news trucks are full digital.

4. Most of the top 40 ADI stations DO NOT use digital. Even the networks still use analog tape. There is some digital equipment in PRODUCTION/EDIT suites, but escept for those of us with Avid Airplay or similar devices, there is no DIGITAL on-line playback in mass quantities. So you are wrong there. Locally, Channel 2 (CBS) uses analog, 5 (NBC) uses MII analog, 7 (ABC) uses Betacart analog. 9, WGN) uses MII and is converting to beta tape.
11 (PBS) uses 1", and beta. 20 (PBS) uses 3/4" U-matic, 26 WCIU) uses 3/4" and some 1/2". 32 (FOX) uses Betacart, 38 uses Avid Airplay, and 3/4". 44 uses Airplay and beta /airplay for news, 50 uses 3/4", 56 uses 3/4", 60 uses 3/4" and beta, 62 uses 3/4", and 66 uses a Betacart. Only two DIGITAL out of 15 stations.

5. HBO and others who use digital on KU band for direct TV, are converting the signal from a received C band ANALOG signal. It is uplinked from HBO on Long Island, downlinked in Colorado, coonverted to compressed digital for Ku.
There is no such think as lossless compression, 2:1 or 50:1 you always lose something. Read teh Snell and Wilcox book, or the Intelsat Digital Satellite book.

6. You are dead wrong on the build up of sidebands on analog NTSC. Unless you transmit a sweep signal, or white noise, the sidebands decrease at a rate
of 30 db/MHz initially, and 15 dB/Mhz after that for any televised scene. Using a time lapse/storage scope, which shows a peak hold, you will always achieve a curve showing the distribution of the sideband energy. That curve
is always decreasing with frequency.   The digital spectrum is FLAT across the entire 6 MHz except for a spike for the pilot tone. So do you want to comp[ete with a sideband that is - 50dBc or continous noise at -12 dBc?

7. The only uncompressed thus lossless digital format is D1, which records in the 4, 4, 4 format. Considering that you cannot get a SINx/X pulse through it nearly as well as you can in an old 2" AVR-1 analog quad machine,
I would say it still has loss!
D2 is a composit ANALOG signal, digitized and bit reduced and is not a DIGITAL recording system. It does not take in 0's and 1's and spit out 0's and 1's, it takes in composit analog NTSC and spits out composoit analog NTSC. Go read up on your "digitized" recording formats. It is NOT digital because the box or name plate says it is digital.

8. NTSC is not "grainy" unless the source is grainy. Even 35 mm film has grain noise.   So look. There is no difference in the S/N ratio of HDTV and
NTSC at the source. In transmission the analog signal S/N ratio decreases with distance in a gradual manner. Transmission/reception standards are such
that a "noiseless" picture is 60 dB S/N. There is noise there, it is not visible tothe naked eye. For video tape and Cable TV figures in the 40 dB-45 dB range are considered acceptable noise levels.   At 30 dB there is noise which mnost people will see easily. The HDTV digital signal will have
an increase in BER (bit error rate) which is masked by processing. Then the
picture degrades to nothing in about 2 dB change of S/N ratio at the BER threshold.   BER covers the noise, but subtracts from the accuracy of the picture in error correction porportional to the increase in BER.

9. Film is usually regarded as 2000 line resolution equivelent. Line doubling (a common term in digital TV) is a cheap way of doubling the number of scan lines on the screen, thus making the individual lines harder to see because they optically blend together. The vertical scan rate is doubled and the same picture is presented twice in the same amount of time. It does not add resolution. With 525 (242.5) you can see individual scan lines and the bigger the screen, the bigger the space between the scan lines,
so you fill in the spaces with duplicate lines. Because of aperature effect
in the display device (CRT or whatever) and the optical limitation of your eyes, the scan lines blend together and "disapear".

10. Horizontal resolution is only slightly better in HDTV than NTSC because the scan line is longer. Thus each pixel must cover more real space (or time) in HDTV, or you must increase the number of pixels per line to compensate for the longer line. Since the screen (CRT) is the same width for
HDTV and NTSC in TIME, the increased numnber of pixels per line simply compensates for the physically wider screen.

11. You cant put your digital equipment on a kite,m R/C plane, small boat, ultralight, car, plane or other portable/mobile operation without considerable vost in money, battery life or physical weight. Analog wins the
weight/battery/size contest every time. It wins the $$ contest every time too.

So go back to your books and read up on the differences between recording and
transmission and between digitized alanog and DIGITAL. Then spout off when you have the right answers. So far you are batting zero.

June 1996

Original source file: ss.9606
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9606

1. RF Design Article

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Tue, 4 Jun 1996 07:52:35 -0400
To: ss@tapr.org
Message-ID: <1B429840.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Can anyone get me a copy of the following article?:

"An Improved Tau-Dither Technique for Spread Spectrum Code
Tracking" RF Design, December 1991 pp.49-55

I would really appreciate it if you can.

Tony, KE4ATO

2. Sine wave PROM

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 5 Jun 1996 09:46:09 -0400
To: ss@tapr.org
Message-ID: <1B58F730.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

I am trying to locate information on generating a sine wave look-up table using C. I had a magazine article (Radio Electronics) that described using a PROM containing the sine wave data. The data was generated using a C program. However, I can't find the article!

Can someone help with this problem?

73s de
Tony, KE4ATO

3. Re: [SS:308] Sine wave PROM

From: Gordon_Dey@Software.Mitel.COM (Gordon Dey)
Date: Wed, 5 Jun 96 11:35:04 EDT
To: ss@tapr.org
Message-ID: <9606051535.AA04477@Software.Mitel.COM>
Rendered body type: text/plain

Just off the top of my head, BF&1 (Brute Force and Ignorance) maybe you could use something like this:

```
#include <stdio.h>
#include <math.h>

int main()
{

        double  d_theta;
        double  A;
        double  DC_offset;
        double  value;

        int             steps;
        int             i;

        steps=8;
        A=255;

        DC_offset=0.5*A;
        d_theta=M_PI*2/steps;

        for(i=0;i<steps;i++) {
                value=DC_offset*sin(i*d_theta) + DC_offset;
                printf(";%d %0.0lf\n",i,value);
        }
        exit(0);
}
```

Tweak steps and A. Compile with "cc sine.c -lm".
Tweak the printf to generate what you want...could be hex, DC.B, S-record, whatever, and feed to your prom programmer.

73, Gord.

4. PN Code Generation Article

From: "James A Vincent" <javincent@iee.org>
Date: Thu, 13 Jun 1996 19:26:31 0000
To: ss@tapr.org
Cc: akestel@mrj.com
Message-ID: <199606131926.OAA04865@tapr.org>
Rendered body type: text/plain

I have recently read a very good (practical and light theory)
article on Pseudorandom Codes, their generation and uses.

For those interested it is -

Pseudo noise sequences for engineers by RN Mutagi
April 1996 Volume 8 Number 2
Electronics & Communication Engineering Journal of the IEE

I'd recommend it !

James Vincent G1PVZ

5. Sinewave generator source code

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 17 Jun 1996 08:16:07 -0400
To: hfsig@tapr.org, ss@tapr.org
Message-ID: <1C54EE50.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

For what its worth, I found the article I was looking for (Radio
Electronics, October 1991). The author used a C program to generate
the data for the EPROM feeding into the DAC. His source code is shown
below. I also attached a sample output file to this note. The EPROM is
a standard 2716. Of course, the code can be modified to suit your
needs.

I intend to use this to produce a LUT (Look Up Table) inside a Xilinx
FPGA. I want to use the LUT as the basis for a QPSK modulator. If I
can feed serial data into the Xilinx, I can then produce I and Q
components and use these as inputs into a custom up/down counter. The
output of the counter will feed into the LUT. The output of the LUT
would then feed into an external DAC. I'm not sure if this can work,
but I will anyone who cares about this now what results I came up
with.

73s de
Tony, KE4ATO

```
/* This program calculates the value of the sine function
   offset so that the 4th and 1st quadrants cause a code
   from 0 to 255. Code is generated to fill a 2048 byte prom
   (2716 or equivalent) for a full circle of 2*pi radians.
   Other size memory may be used by changing the value of
   bytes in the declaration table.
*/

#include <stdio.h>
#include <math.h>

main ()
{
  double p=0;           /* phase input to sine function */
       double S=0;      /* output value of the true sine function */
       int s;           /* amplitude truncated to 8 bits */
       double sin();    /* true sine function */
       double pi=3.141592654;
       int addr=0;      /* address of EPROM */
       int bytes=2048;  /* size of EPROM in bytes */

       printf("          0    1    2    3    4    5    6    7    8");
       printf("    9    A    B    C    D    E    F  \n");
       while (addr < bytes)
         {
         if (addr % 16 == 0)
```

```
          printf("\n%4x   ", addr);
        p = 2.0*pi*( (double) addr)/( (double) bytes);
        S = 127.5*(1.0 + sin(p - pi/2.0));       /* gives 0 at -90 deg */
        s = ( (int) S);                          /* convert to integer */
        if (S - ( (double) s) >= 0.5)            /* rounds if necessary */
          s++;
        printf("   %2x", s);
        addr++;                                  /* increment address */
        }
    return (0);
    }
```

[Attachment: output.txt; text/basic; 9,290 bytes]

6. Subject: Spread Spectrum Hardware

From: Chris Dapples <ccdapple@wtpprod1.wtp.net>
Date: Tue, 18 Jun 1996 13:34:42 MDT
To: ss@tapr.org
Message-ID: <XFMail.960618134017.ccdapple@mail.wtp.net>
Rendered body type: text/plain

Hi All,

   Since the ARRL Spread Sprectum Sourcebook is getting somewhat out of date,
I was wondering what hardware is available for amateur experimentation?
I am not an electrical engineer and have very limited access to chips and
parts. So building from scratch is at the low end of options, unless kits
are available.

        73. Chris / KF7KN

        ax25---->   KF7KN@KF7KN.#SCMT.MT.USA.NOAM
        TCP/IP-->   44.82.72.2
        E-MAIL-->   kf7kn@amsat.org

7. Re: [SS:310] PN Code Generation Article

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 19 Jun 1996 15:25:35 -0400
To: ss@tapr.org
Message-ID: <1C8562A0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

James,

     I don't have access to this periodical. Is there any way you could
     send me a copy?

     73s de
     Tony, KE4ATO

_____________________________ Reply Separator _____________________________
Subject: [SS:310] PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/13/96 2:33 PM

I have recently read a very good (practical and light theory)
article on Pseudorandom Codes, their generation and uses.

For those interested it is -

Pseudo noise sequences for engineers by RN Mutagi
April 1996 Volume 8 Number 2
Electronics & Communication Engineering Journal of the IEE

I'd recommend it !

James Vincent G1PVZ

8. Re: [SS:313] Re: PN Code Generation Article

From: "James A Vincent" <javincent@iee.org>
Date: Sun, 23 Jun 1996 19:32:18 0000
To: ss@tapr.org
Message-ID: <199606241844.NAA01558@tapr.org>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org

> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
>
>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

9. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 15:03:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835653895@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
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>   73s de
>   Tony, KE4ATO

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postal address again and I will send you a copy of the PN article.

Regards,
James

10. Re: [SS:314] Re: PN Code Generation Article

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 24 Jun 1996 16:52:04 -0400
To: ss@tapr.org
Message-ID: <1CF02510.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)

> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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Regards,
James

11. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 16:02:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835657435@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
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>   73s de
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Tony,

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postal address again and I will send you a copy of the PN article.

Regards,
James

12. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 16:47:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835660134@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org

> Subject: [SS:313] Re: PN Code Generation Article

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>
>   I don't have access to this periodical. Is there any way you could
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Regards,
James

13. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 17:02:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835661034@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>   73s de
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postal address again and I will send you a copy of the PN article.

Regards,
James

14. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 17:42:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835663434@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>   I don't have access to this periodical. Is there any way you could
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>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

15. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 17:54:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835664154@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>   I don't have access to this periodical. Is there any way you could
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>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

16. Surface Acoustic Wave

From: Julian Fields <jfields@cisco.com>
Date: Mon, 24 Jun 1996 16:15:30 -0700
To: ss@tapr.org
Message-ID: <199606242315.QAA03416@mt-waterman.cisco.com>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
Part 15 bands (902-928Mhz, 2.4 Gig, 5 gigahertz).

1. Does anybody make SAW filters for these bands in
   off the shelf (low quantity).

2. What is the max power you can send thru these?
   Part 15 are limited to 1 watt. Can they handle
   1 watt and still act like a filter or do they
   go non-linear?
   Would it be wiser to filter a few stages before
   the final output stage to avoid overdrive?

3. On receive, are SAW's better than LC filters?
   I know there is a loss of dB which would increase
   noise, so should there be a SAW allowed before
   the RF amplifier?
   Is noise any concern since you are mostly
   concerned with interference from other
   Part 15, ISM, and Amateur rather than
   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

17. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 18:24:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835665954@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
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>
>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

18. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 18:32:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835666434@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

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        Altamonte Springs, FL   32714-4633

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Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
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> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>   73s de
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postal address again and I will send you a copy of the PN article.

Regards,
James

19. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 19:07:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835668535@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

Yes, I got the article; It is very good!

I would appreciate a copy of the PN article.

My postal address is

Tony Lanier, KE4ATO
687 Jamestown Blvd, Apt.2006
Altamonte Springs, FL 32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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> Tony, KE4ATO

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20. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 19:16:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835669074@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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> 73s de
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Regards,
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21. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 19:32:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835670034@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
Part 15 bands (902-928Mhz, 2.4 Gig, 5 gigahertz).

1. Does anybody make SAW filters for these bands in
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2. What is the max power you can send thru these?
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   I know there is a loss of dB which would increase
   noise, so should there be a SAW allowed before
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   Is noise any concern since you are mostly
   concerned with interference from other
   Part 15, ISM, and Amateur rather than
   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

22. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 19:54:07 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835671327@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

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23. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 19:55:07 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835671427@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
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>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

24. Re: [SS:322] Surface Acoustic Wave

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 24 Jun 96 19:15:09 UTC
To: ss@tapr.org
Message-ID: <10534@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Julian,

  Murata makes a 2.4 Ghz filter, but it only covers the ISM SS portion of
the band. It cuts off at 2.400 Ghz.

  These filters are not interdigital type filters. So, they are not that
much better than , or any better at all, than standard analog microwave
filters. They use a SAW device as a resonator, then have multiple reson-
ators. The advantage is that they are very small, and can be circuit
board mounted. The losses are worse than waveguide, or airline interdigital
filters, but comparable with small strip line interdigital filters, on
ciruit board material, or microstrip filters.

  On 900 Mhz, ceramic loaded coaxial resonator filters are practical. Most
Cellular phones use these type of filters for a duplexor. I believe there
are some SAW device Cellular telephone duplexors out there, but again, they
would be SAW resonator filters, not interdigital transducer type. I don t have
any info handy on these. U might check with Fujitsu.

  5 Ghz, is a bit high for SAW devices. Ceramic loaded waveguide would prob-
bably be a better small foot print way to go.

  I ve not heard of anything being mass-produced for 5 Ghz, myself, yet.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

25. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 20:08:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835672195@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
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>   I don't have access to this periodical. Is there any way you could
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Regards,
James

26. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 20:18:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835672794@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
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   I know there is a loss of dB which would increase
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   Is noise any concern since you are mostly
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   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

27. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 20:38:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835673995@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

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        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

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Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
>
>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

28. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 20:49:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835674654@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hi Julian,

  Murata makes a 2.4 Ghz filter, but it only covers the ISM SS portion of
the band. It cuts off at 2.400 Ghz.

  These filters are not interdigital type filters. So, they are not that
much better than , or any better at all, than standard analog microwave
filters. They use a SAW device as a resonator, then have multiple reson-
ators. The advantage is that they are very small, and can be circuit
board mounted. The losses are worse than waveguide, or airline interdigital
filters, but comparable with small strip line interdigital filters, on
ciruit board material, or microstrip filters.

  On 900 Mhz, ceramic loaded coaxial resonator filters are practical. Most
Cellular phones use these type of filters for a duplexor. I believe there
are some SAW device Cellular telephone duplexors out there, but again, they
would be SAW resonator filters, not interdigital transducer type. I don t have
any info handy on these. U might check with Fujitsu.

  5 Ghz, is a bit high for SAW devices. Ceramic loaded waveguide would prob-
bably be a better small foot print way to go.

  I ve not heard of anything being mass-produced for 5 Ghz, myself, yet.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

29. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 20:58:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835675194@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
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>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

30. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 21:13:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835676095@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
Part 15 bands (902-928Mhz, 2.4 Gig, 5 gigahertz).

1. Does anybody make SAW filters for these bands in
   off the shelf (low quantity).

2. What is the max power you can send thru these?
   Part 15 are limited to 1 watt. Can they handle
   1 watt and still act like a filter or do they
   go non-linear?
   Would it be wiser to filter a few stages before
   the final output stage to avoid overdrive?

3. On receive, are SAW's better than LC filters?
   I know there is a loss of dB which would increase
   noise, so should there be a SAW allowed before
   the RF amplifier?
   Is noise any concern since you are mostly
   concerned with interference from other
   Part 15, ISM, and Amateur rather than
   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

31. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 21:18:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835676394@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

My postal address is

Tony Lanier, KE4ATO
687 Jamestown Blvd, Apt.2006
Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
>
>   73s de
>   Tony, KE4ATO

Tony,

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postal address again and I will send you a copy of the PN article.

Regards,
James

32. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 21:33:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835677295@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hi Julian,

  Murata makes a 2.4 Ghz filter, but it only covers the ISM SS portion of
the band. It cuts off at 2.400 Ghz.

  These filters are not interdigital type filters. So, they are not that
much better than , or any better at all, than standard analog microwave
filters. They use a SAW device as a resonator, then have multiple reson-
ators. The advantage is that they are very small, and can be circuit
board mounted. The losses are worse than waveguide, or airline interdigital
filters, but comparable with small strip line interdigital filters, on
ciruit board material, or microstrip filters.

  On 900 Mhz, ceramic loaded coaxial resonator filters are practical. Most
Cellular phones use these type of filters for a duplexor. I believe there
are some SAW device Cellular telephone duplexors out there, but again, they
would be SAW resonator filters, not interdigital transducer type. I don t have
any info handy on these. U might check with Fujitsu.

  5 Ghz, is a bit high for SAW devices. Ceramic loaded waveguide would prob-
babbly be a better small foot print way to go.

  I ve not heard of anything being mass-produced for 5 Ghz, myself, yet.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

33. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 21:47:06 cst

To: ss@tapr.org
Message-ID: <9605248356.AA835678134@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
Part 15 bands (902-928Mhz, 2.4 Gig, 5 gigahertz).

1. Does anybody make SAW filters for these bands in
   off the shelf (low quantity).

2. What is the max power you can send thru these?
   Part 15 are limited to 1 watt. Can they handle
   1 watt and still act like a filter or do they
   go non-linear?
   Would it be wiser to filter a few stages before
   the final output stage to avoid overdrive?

3. On receive, are SAW's better than LC filters?
   I know there is a loss of dB which would increase
   noise, so should there be a SAW allowed before
   the RF amplifier?
   Is noise any concern since you are mostly
   concerned with interference from other
   Part 15, ISM, and Amateur rather than
   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

34. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 22:02:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835679034@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
>
>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

35. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 22:10:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835679514@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO

687 Jamestown Blvd, Apt.2006
Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
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>   I don't have access to this periodical. Is there any way you could
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>   73s de
>   Tony, KE4ATO

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postal address again and I will send you a copy of the PN article.

Regards,
James

36. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 22:32:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835680883@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hi Julian,

  Murata makes a 2.4 Ghz filter, but it only covers the ISM SS portion of
the band. It cuts off at 2.400 Ghz.

  These filters are not interdigital type filters. So, they are not that
much better than , or any better at all, than standard analog microwave
filters. They use a SAW device as a resonator, then have multiple reson-
ators. The advantage is that they are very small, and can be circuit
board mounted. The losses are worse than waveguide, or airline interdigital
filters, but comparable with small strip line interdigital filters, on
ciruit board material, or microstrip filters.

  On 900 Mhz, ceramic loaded coaxial resonator filters are practical. Most
Cellular phones use these type of filters for a duplexor. I believe there
are some SAW device Cellular telephone duplexors out there, but again, they
would be SAW resonator filters, not interdigital transducer type. I don t have
any info handy on these. U might check with Fujitsu.

  5 Ghz, is a bit high for SAW devices. Ceramic loaded waveguide would prob-
bably be a better small foot print way to go.

  I ve not heard of anything being mass-produced for 5 Ghz, myself, yet.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

37. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 22:35:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835681014@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
Part 15 bands (902-928Mhz, 2.4 Gig, 5 gigahertz).

1. Does anybody make SAW filters for these bands in
   off the shelf (low quantity).

2. What is the max power you can send thru these?
   Part 15 are limited to 1 watt. Can they handle
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   go non-linear?
   Would it be wiser to filter a few stages before
   the final output stage to avoid overdrive?

3. On receive, are SAW's better than LC filters?
   I know there is a loss of dB which would increase
   noise, so should there be a SAW allowed before
   the RF amplifier?
   Is noise any concern since you are mostly
   concerned with interference from other
   Part 15, ISM, and Amateur rather than
   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

38. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 22:42:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835681434@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
>
>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

39. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 22:55:06 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835682215@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>
>   I don't have access to this periodical. Is there any way you could
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>   73s de
>   Tony, KE4ATO

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postal address again and I will send you a copy of the PN article.

Regards,
James

40. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Mon, 24 Jun 96 23:28:05 cst
To: ss@tapr.org
Message-ID: <9605248356.AA835684194@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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Regards,
James

41. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Tue, 25 Jun 96 00:03:07 cst
To: ss@tapr.org
Message-ID: <9605258356.AA835686295@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

James,

     Yes, I got the article; It is very good!

     I would appreciate a copy of the PN article.

     My postal address is

        Tony Lanier, KE4ATO
        687 Jamestown Blvd, Apt.2006
        Altamonte Springs, FL   32714-4633

_____ Reply Separator _____
Subject: [SS:314] Re: PN Code Generation Article
Author: ss@tapr.org at BALT.SMTP
Date: 6/24/96 1:48 PM

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

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>   I don't have access to this periodical. Is there any way you could
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Tony,

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postal address again and I will send you a copy of the PN article.

Regards,
James

42. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Tue, 25 Jun 96 00:03:08 cst
To: ss@tapr.org
Message-ID: <9605258356.AA835686395@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hi Julian,

  Murata makes a 2.4 Ghz filter, but it only covers the ISM SS portion of
the band. It cuts off at 2.400 Ghz.

  These filters are not interdigital type filters. So, they are not that
much better than , or any better at all, than standard analog microwave
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filters, but comparable with small strip line interdigital filters, on
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  On 900 Mhz, ceramic loaded coaxial resonator filters are practical. Most
Cellular phones use these type of filters for a duplexor. I believe there
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would be SAW resonator filters, not interdigital transducer type. I don t have
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bably be a better small foot print way to go.

  I ve not heard of anything being mass-produced for 5 Ghz, myself, yet.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

43. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Tue, 25 Jun 96 00:04:08 cst
To: ss@tapr.org
Message-ID: <9605258356.AA835686494@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

Hello,
I have some questions about SAW filters for the
Part 15 bands (902-928Mhz, 2.4 Gig, 5 gigahertz).

1. Does anybody make SAW filters for these bands in
   off the shelf (low quantity).

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   Would it be wiser to filter a few stages before
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   Is noise any concern since you are mostly
   concerned with interference from other
   Part 15, ISM, and Amateur rather than
   noise in Part 15 devices?

I've heard that SAW's are smaller, better filters,
but don't know their limitations.

Thanks,
Julian
WA4CKY (expired)

44. Message not deliverable

From: Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil
Date: Tue, 25 Jun 96 00:32:06 cst
To: ss@tapr.org
Message-ID: <9605258356.AA835688034@nrlsscgw.nrlssc.navy.mil>
Rendered body type: text/plain

> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> Reply-to: ss@tapr.org
> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> To: ss@tapr.org
> Subject: [SS:313] Re: PN Code Generation Article

>   James,
>
>   I don't have access to this periodical. Is there any way you could
>   send me a copy?
>
>   73s de
>   Tony, KE4ATO

Tony,

Did you get my article I sent to you via Steven Bible. Please send me your
postal address again and I will send you a copy of the PN article.

Regards,
James

45. Re: [SS:350] Message not deliverable

From: "Ronald C. Barnes" <ka1kjz@tigger.jvnc.net>
Date: Tue, 25 Jun 1996 10:34:22 -0400
To: ss@tapr.org
Message-ID: <199606251434.AA18478@tigger.jvnc.net>
Rendered body type: text/plain

Sombody wanna fix this?

At 12:46 AM 6/25/96 -0500,
Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil wrote:
>> Date: Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
>> Reply-to: ss@tapr.org
>> From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
>> To: ss@tapr.org
>> Subject: [SS:313] Re: PN Code Generation Article
>
>>   James,
>>
>>   I don't have access to this periodical. Is there any way you could
>>   send me a copy?
>>
>>   73s de
>>   Tony, KE4ATO
>
>Tony,

>
>Did you get my article I sent to you via Steven Bible. Please send me your
>postal address again and I will send you a copy of the PN article.
>
>Regards,
>James
>
>
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****
** Ronald C. Barnes KA1KJZ   Engineering Tech, Group W Satellite **
** 1591 W. Broad Street   ARRL CT Section Technical Coord.   **
** Stratford, CT 06497   Member, Soc. Broadcast Engineers   **
**   **
** The preceding are my opinions, mine, mine, mine!   **
** Any attempt to say otherwise will result in a hearty laugh   **
****

46. Re: [SS:351] Re: Message not deliverable

From: Julian Fields <jfields@cisco.com>
Date: Tue, 25 Jun 1996 09:39:20 -0700
To: ss@tapr.org
Message-ID: <199606251639.JAA05905@harrier.cisco.com>
Rendered body type: text/plain

Note to SS email list subscribers:
Posts are being bounced
because somebody has an undeliverable email address.
This automatic reply is sent back to ss@tapr.org
and posted to everybody. The "undeliverable email address"
message also gets a reply that it was undeliverable
creating an infinite loop.

The way I have seen this fixed in the PCI sig
email list is that the Reply-To: header goes to
an admin of the email list or to a null account.
The disadvantage is that users of the email list
cannot just hit the reply button, but must specifically
address to ss@tapr.org

47. Re: [SS:352] Re: Message not deliverable

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Tue, 25 Jun 1996 15:22:00 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960625152138.2008A-100000@zeus>
Rendered body type: text/plain

>
> The way I have seen this fixed in the PCI sig
> email list is that the Reply-To: header goes to
> an admin of the email list or to a null account.
> The disadvantage is that users of the email list
> cannot just hit the reply button, but must specifically
> address to ss@tapr.org
>

Isn't that why someone invented the Errors-To: header?

Bernie

48. Re: [SS:351] Re: Message not deliverable

From: ATVQ@aol.com
Date: Tue, 25 Jun 1996 15:45:48 -0400
To: ss@tapr.org
Message-ID: <960625154546_563867809@emout09.mail.aol.com>

Rendered body type: text/plain

had 27 in my box

49. Re: [SS:351] Re: Message not deliverable

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 25 Jun 1996 15:02:56 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199606252002.PAA01558@tapr.org>
Rendered body type: text/plain

```
We fixed it after the firsty few messages -- unfornately the other site
still had several queued.

Cheers - grg

>
> Sombody wanna fix this?
>
> At 12:46 AM 6/25/96 -0500,
> Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil wrote:
> >> Date:          Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> >> Reply-to:      ss@tapr.org
> >> From:          LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> >> To:            ss@tapr.org
> >> Subject:       [SS:313] Re: PN Code Generation Article
> >
> >>      James,
> >>
> >>      I don't have access to this periodical. Is there any way you could
> >>      send me a copy?
> >>
> >>      73s de
> >>      Tony,  KE4ATO
> >
> >Tony,
> >
> >Did you get my article I sent to you via Steven Bible.  Please send me your
> >postal address again and I will send you a copy of the PN article.
> >
> >Regards,
> >James
> >
> >
> >
> >
> >
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> >
> >
> >
> >
> >
> >
> >
> >
> >
> --
> ***********************************************************************
> ** Ronald C. Barnes  KA1KJZ      Engineering Tech, Group W Satellite **
> ** 1591 W. Broad Street                ARRL CT Section Technical Coord.    **
> ** Stratford, CT  06497          Member, Soc. Broadcast Engineers    **
> **                                                                   **
> ** The preceding are my opinions, mine, mine, mine!                  **
> ** Any attempt to say otherwise will result in a hearty laugh        **
> ***********************************************************************
>
>
```

50. Re: [SS:352] Re: Message not deliverable

From: KATAYAMA Masaaki <katayama@ogawa.nuee.nagoya-u.ac.jp>
Date: Wed, 26 Jun 1996 09:12:00 JST
To: ss@tapr.org
Message-ID: <199606260011.JAA09127@westar.ogawa.nuee.nagoya-u.ac.jp>
Rendered body type: text/plain

In article <199606251639.JAA05905@harrier.cisco.com>,
Julian Fields <jfields@cisco.com> writes:

```
Julian> Note to SS email list subscribers:
Julian> Posts are being bounced
  :
Julian> The way I have seen this fixed in the PCI sig
Julian> email list is that the Reply-To: header goes to
Julian> an admin of the email list or to a null account.

How about adding Errors-To: field in the header of the mail...

--je3mxq/aa8wk/
```

51. Re: [SS:351] Re: Message not deliverable

```
From: Dr Mike Kelley <mkelley@osf1.gmu.edu>
Date: Tue, 25 Jun 1996 21:42:11 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.OSF.3.91.960625214121.24849C-100000@osf1.gmu.edu>
Rendered body type: text/plain
```

What gives?? I got 30 of these a while ago, and a bunch again now. The message may not be deliverable, but I'm getting my copies more than once.

-Mike

On Tue, 25 Jun 1996, Ronald C. Barnes wrote:

```
> Sombody wanna fix this?
>
> At 12:46 AM 6/25/96 -0500,
> Administrator_at_NRL-7030-PO@nrlsscgw.nrlssc.navy.mil wrote:
> >> Date:          Wed, 19 Jun 1996 14:46:23 -0500 (CDT)
> >> Reply-to:      ss@tapr.org
> >> From:          LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
> >> To:            ss@tapr.org
> >> Subject:       [SS:313] Re: PN Code Generation Article
> >
> >>      James,
> >>
> >>      I don't have access to this periodical. Is there any way you could
> >>      send me a copy?
> >>
> >>      73s de
> >>      Tony,  KE4ATO
> >
> >Tony,
> >
> >Did you get my article I sent to you via Steven Bible.  Please send me your
> >postal address again and I will send you a copy of the PN article.
> >
> >Regards,
> >James
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> --
> ************************************************************************
> ** Ronald C. Barnes  KA1KJZ      Engineering Tech, Group W Satellite **
> ** 1591 W. Broad Street               ARRL CT Section Technical Coord.    **
> ** Stratford, CT  06497          Member, Soc. Broadcast Engineers    **
> **                                                                    **
> ** The preceding are my opinions, mine, mine, mine!                   **
> ** Any attempt to say otherwise will result in a hearty laugh         **
> ************************************************************************
>
>
```

52. Prism Chipset

From: chbrain@dircon.co.uk (Charles Brain)
Date: Wed, 26 Jun 1996 06:25:52 +0100
To: ss@tapr.org
Message-ID: <199606260532.AA18995@felix.dircon.co.uk>
Rendered body type: text/plain

Hello,

Has anybody tried using the Harris Prism chipset? Although the baseband
processor is not legal for U.S Ham SS use the other members of the chipset
make a nice 2.4 Ghz radio front end ? I am going to try to get a copy of
ETS 300 328 (the European 2.4Ghz ISM SS spec) this week.

By the way for U.K readers, I had a letter from the RA, apparently
legalisation of Amateur SS in the U.K is to be discussed at the next
meeting with the RSGB. They consider SS to be illegal under the U.K
licence as they consider the spreading codes to be 'encryption' which
is forbidden under 1.(4)(b) of BR68.

53. Re: [SS:330] Re: Surface Acoustic Wave

From: Julian Fields <jfields@cisco.com>
Date: Wed, 26 Jun 1996 10:53:35 -0700
To: ss@tapr.org
Message-ID: <199606261753.KAA02437@harrier.cisco.com>
Rendered body type: text/plain

> These filters are not interdigital type filters. So, they are not that
> much better than , or any better at all, than standard analog microwave
> filters. They use a SAW device as a resonator, then have multiple reson-
> ators. The advantage is that they are very small, and can be circuit
> board mounted. The losses are worse than waveguide, or airline interdigital
> filters, but comparable with small strip line interdigital filters, on
> ciruit board material, or microstrip filters.

I did not realize there was a "resonator" type of SAW, I have
only heard of interdigital. What is this like?

> On 900 Mhz, ceramic loaded coaxial resonator filters are practical. Most
> Cellular phones use these type of filters for a duplexor. I believe there
> are some SAW device Cellular telephone duplexors out there, but again, they
> would be SAW resonator filters, not interdigital transducer type. I don t have
> any info handy on these. U might check with Fujitsu.

Who sells ceramic loaded coaxial resonator filters, since these
seem to fit the bill better? I would like to order a databook
or reference material
to learn more. I have one article in ARRL Microwave Experimenter's
guide, but it talks about sizes being 2" to 5" inside the 'U' shaped
cavity (don't know what ceramic loading is).
This would be way too big for a hand-held cellular phone
or 900Mhz SS phone.
I had heard that duplexor in cellular
phones had to have a steep slope filter function, since the
transmitter and receiver operate at the same time, using the same
antenna, and very close in frequency.
Do they make them with
wide enough bandpass (26Mhz, 80Mhz, for example) to use in spread spectrum?

> 5 Ghz, is a bit high for SAW devices. Ceramic loaded waveguide would prob-
> bably be a better small foot print way to go.
>
> I ve not heard of anything being mass-produced for 5 Ghz, myself, yet.
>
>
> 73, Don.
>
> Mailbox : WB9MJN @ N9HSI.IL.USA.NA
> AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
> Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

Very good info, Don.
Thanks for the input,
Julian

54. Re: [SS:358] Prism Chipset

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 26 Jun 1996 15:06:50 -0400
To: ss@tapr.org
Message-ID: <1D18BF90.1858@smtpgty.bwi.wec.com>

Rendered body type: text/plain

The PRISM chipset by Harris is fairly expensive. The demo board for
this chipset is ~1500.00!! You MIGHT get samples, but I doubt it.

As the British thinking that SS is encryption...SS is another form of
modulation, that's all. The data is not (necessarily) encoded. If they
limit the PN codes, as is done here in the states, then monitoring
will not be a problem. Oh well, so much for bureaucrats!! :(

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:358] Prism Chipset
Author: ss@tapr.org at BALT.SMTP
Date: 6/26/96 12:41 AM

Hello,

Has anybody tried using the Harris Prism chipset? Although the baseband
processor is not legal for U.S Ham SS use the other members of the chipset
make a nice 2.4 Ghz radio front end ? I am going to try to get a copy of
ETS 300 328 (the European 2.4Ghz ISM SS spec) this week.

By the way for U.K readers, I had a letter from the RA, apparently
legalisation of Amateur SS in the U.K is to be discussed at the next
meeting with the RSGB. They consider SS to be illegal under the U.K
licence as they consider the spreading codes to be 'encryption' which
is forbidden under 1.(4)(b) of BR68.

55. Re: [SS:359] Re: Surface Acoustic Wave

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Wed, 26 Jun 1996 12:43:32 -0800 (PDT)
To: ss@tapr.org (Julian Fields)
Message-ID: <199606261943.AA215908212@hpsadr2.sr.hp.com>
Rendered body type: text/plain

> Who sells ceramic loaded coaxial resonator filters, since these
> seem to fit the bill better? I would like to order a databook
> or reference material

A number of companies sell finished filters, but generally the catalog
items don't seem too great for amateur use. Murata-Erie, for example,
has a variety but probably only if you want an ISM band filter.
Integrated Microwave will make samples and prototype quantities but I
suspect for ham use the price is prohibitive.

  The actual ceramic material is only made by half a dozen, or so,
companies worldwide, as I understand it. I think the filter houses buy
it "green", process it and then fire it, after which it is very tough.
I tried to tune a 900 MHz filter one time and it took a diamond tip.
Even then the going was so slow that I lost interest pretty fast.

> to learn more. I have one article in ARRL Microwave Experimenter's
> guide, but it talks about sizes being 2" to 5" inside the 'U' shaped
> cavity (don't know what ceramic loading is).
> This would be way too big for a hand-held cellular phone
> or 900Mhz SS phone.
> I had heard that duplexor in cellular
> phones had to have a steep slope filter function, since the
> transmitter and receiver operate at the same time, using the same
> antenna, and very close in frequency.
> Do they make them with
> wide enough bandpass (26Mhz, 80Mhz, for example) to use in spread spectrum?

The cell-tel duplexers I have seen have quite a few resonator sections
in them, perhaps a dozen. Not a surprise since they do need pretty good
shape factor to pass ~25 MHz and reject ~25 MHz just a little ways away.
I have a plot of one I made, if you are interested.

  The resonator sections that all these filters are made from are
normally just shorted quarter wave lines made by silver plating inner
and outer conductors onto the dielectric. Filter properties are managed
by end coupling, usually with lumped elements since the patent for
aperture coupling is still in effect. Slight tuning is sometimes
handled with a grinding tool and/or little blocks of dielectric added at
the ends of the resonators. Typical resonators have line impedance in the

5-15 ohm territory and Q's of 300 or so. Tuning is evidently necessary
since getting a precise dielectric constant seems to be something of an
art form.

  Personally, I'm not terribly impressed by ceramic resonators. While
they do offer reasonable Q in small volume, they are difficult to obtain
and work with in small quantities making them less desirable for amateur
radio projects. I did use ceramic filters in the 230 kbps radios (3
per) but only because I was building at their design frequency and I was
able to get quantitites at $0.50/ea.

  For L3TNC, I'm looking at using stripline resonators instead. With
some of the newer PC board materials, it is possible to get Q limited
primarily by conductor losses rather than dielectric losses. Qs
similar to those of the ceramic resonators are possible. Stripline
requires multilayer board process or mechanical sandwiching of two
two-layer designs but even so is much more something that can be done in
the ham shack. I have prototyped with 1/16" board; microstrip sandwiched
with a single-sided piece above to create 1/8" stripline.
  It is possible to do either edge/broadside coupling for these filters
or to use lumped elements, through low UHF, since the line impedances
can be so low.

The PC board approach is automatically shielded (to be fair, so are ceramic
resonators for the most part) and allows surface mount parts to coexist
in the same board space if not too many vias are punched through there.

After looking at air and ceramic dielectric filters, I'm now trying to
build oscillator resonator, ratrace mixers and bandpass filters all
inside the PC board for a completely no-tune design which at the same
time has high_Q/low_phasenoise/good_shape_factor, for L3TNC. So far, it
seems to be working.

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|
| |
| http://www.tapr.org/~n6gn/index.html | |

56. Re: [SS:360] Re: Prism Chipset

From: chbrain@dircon.co.uk (Charles Brain)
Date: Wed, 26 Jun 1996 21:48:09 +0100
To: ss@tapr.org
Message-ID: <199606262055.AA06789@felix.dircon.co.uk>
Rendered body type: text/plain

>   The PRISM chipset by Harris is fairly expensive. The demo board for
>   this chipset is ~1500.00!! You MIGHT get samples, but I doubt it.
>
>   As the British thinking that SS is encryption...SS is another form of
>   modulation, that's all. The data is not (necessarily) encoded. If they
>   limit the PN codes, as is done here in the states, then monitoring
>   will not be a problem. Oh well, so much for bureaucrats!! :(
>
>   73s de
>   Tony, KE4ATO
>
So much for Harris claiming that a PCMIA card costing less than $300
has been developed by a third party.

I was really only looking at the rf chips, I was speaking to one of our
chip designers at work and he is going to let me know how much it would
take to produce a 'clone' of the baseband chip (using a longer pn sequence).

As far as the SS encryption is concerned, yes I agree. The question I asked
was the possibility of using a licence free SS link to pass ham traffic. I don't
know what range the U.S 13cm band covers but the U.K one includes part of
the ISM band. (2310 - 2450 HAM) (2400 - 2483 ISM)

73 Charles G4GUO

57. Re: [SS:359] Re: Surface Acoustic Wave

From: wb9mjn@wb9mjn.ampr.org
Date: Wed, 26 Jun 96 20:36:48 UTC
To: ss@tapr.org
Message-ID: <10577@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Julian, and Glen,

The SAW resonator technigue, if i remember this correctly, starts with a Simple 2 or 3 section SAW Interdigital structure, but instead of feeding across the IDT (Interdigtal Transducer) the signal is fed thru the trans ducer.

This generates saw waves bidrectionally from the IDT, which are then re- flected back to the IDT structure, and out of the filter, by SAW resonators, . The SAW resonators are are acousitical reflectors, which are sharply tuned, and made similar to a IDT, but with no electrical connection.

Multiple SAW resonators can be put on a die, and even multiple dies used to create the finished response.

Of course, this is completely different from a Interdigital SAW filter, where the transucer finger lengths follow the Impulse response of the desired filter function. And thus, FIR filters can be implimented in quartz.

In the SAW resonator filter, all the finger lengths are the full size. Its the spacing between the fingers that determines the filter freq.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

58. New Info on TAPR Spread Spectrum Page

From: Greg Jones <wd5ivd@tapr.org>
Date: Thu, 27 Jun 1996 08:51:19 -0500 (CDT)
To: ss@tapr.org (Spread Spectrum)
Message-ID: <199606271351.IAA27426@tapr.org>
Rendered body type: text/plain

Several things have been added to the Spread Spectrum page in the last few weeks. You might want to check them.

http://www.tapr.org/ss

Plus -- TAPR.ORG has relocated -- with much improved performance.

Cheers - greg

July 1996

Original source file: ss.9607
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9607

1. Some news from the WLAN front...

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Wed, 3 Jul 1996 03:39:08 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199607030339.DAA08368@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Sure is quiet on this list... maybe I can stir something up. :-)

I was recently at the IEEE MTT Microwave Symposium in San Francisco, and while there, attended a workshop called "Wireless LAN - What's Next?". Here's a few tidbits I picked up...

The market for WLANs has been very slow to develop - one speaker estimated that the current market is less than 10% of what had been projected in 1992, and the market has turned out to be "vertical" rather than "horizontal". Although cost and performance issues are certainly factors, there was general agreement that lack of user education on what WLANs are all about has been a major impediment to expanding the market.

The 802.11 standardization effort continues to lurch along... latest estimate is that the committee will get down to serious voting around November. In general, I got the sense that the outlook for 802.11 is pretty gloomy. Most insiders seem to be convinced that the standard won't result in hardware from different vendors that will inter-operate. About the best that can be hoped for is that the common air interface will result in "RF coexistence" between different products, i.e., they will share the spectrum gracefully - but even this objective is undermined by the fact that the standard will allow both DS and FH products. One person involved in the process said 802.11 was "not a good standard", "not technically great", "complicated", and "hard to implement". Sounds good, eh?

There was quite a bit of discussion about the prospects for higher-speed products. A representative of Clarion in Japan said that they will soon introduce a 10 Mbps 2.4 GHz DS product in the US... no details on pricing, etc yet. Harris is also working on a 10 Mbps chipset. There was some mention of the developing HIPERLAN 20 Mbps (some documents say 25) standard in Europe (see http://www.etsi.fr/ecs/reports/stateart/bourin.htm). The FCC NII/SUPERNet NPRM (http://www.fcc.gov/oet/info/nii5ghz.html) may pave the way for HIPERLAN at 5.2 GHz in the US.

A scheduled speaker from Xircom was a no-show... apparently Xircom is scrapping its Netwave product and getting out of the WLAN business.

Elsewhere at the conference, there was an interesting keynote address from FCC chairman Reed Hundt (videotaped, since he was called to some hearings and couldn't make it to the conference), who talked about the FCC's "flexible, market-oriented approach to the use of spectrum". His talk was peppered with phrases like "no government micromanagement" and "let the market pick the technologies". Also speaking (in person) was Mike Marcus of the FCC Office of Engineering and Technology, who I'm told was the prime mover behind establishing unlicenced ISM band operation in the US. An audience member attacked the FCC's declining interest in enforcement, stating that the ISM bands were becoming a shambles because the rules were being openly flaunted. He gave an example of a company in Nevada who is advertising a digital video WLAN product for unlicenced ISM band operation which has 2W into a 27 dBi gain antenna - 1KW ERP! Marcus replied that "enforcement doesn't make friends", and that increased enforcement wasn't likely to happen unless there was a strong push from the grassroots level for it... he did mention that an 800 number was being established to field complaints, though.

I suppose that this atmosphere of deregulation bodes well for increased use of SS in the amateur bands... on the other hand, a "market-oriented" approach to spectrum management doesn't sound too encouraging for the future of amateur radio, does it?

Anyhow, there's my report... discussion, anyone?

Barry

```
--
  Barry McLarnon  VE3JF/VA3TCP   |  Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club      |  AMPRnet:  bm@lynx.ve3jf.ampr.org
  Packet Working Group           |  Web:      http://hydra.carleton.ca
```

2. 915 MHz WaveLAN cards avail $199 ea

From: "Robert A. Buaas" <buaas@wireless.wdc.net>
Date: Wed, 3 Jul 1996 07:53:04 -0700
To: ss@tapr.org
Cc: buaas@wireless.wdc.net
Message-ID: <199607031453.HAA23371@wireless.wdc.net>
Rendered body type: text/plain

It's come to my attention that 100+ of these cards
are soon to be available. Not much chance of
negotiating the price lower than this. Pls
email direct if you're interested.

best regards/bob K6KGS

3. Re: [SS:365] Some news from the WLAN front...

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Wed, 3 Jul 1996 07:56:29 -0800 (PDT)
To: ss@tapr.org (Barry McLarnon VE3JF)
Message-ID: <199607031456.AA084705789@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Barry writes:

> I was recently at the IEEE MTT Microwave Symposium in San Francisco, and
> while there, attended a workshop called "Wireless LAN - What's Next?".
> Here's a few tidbits I picked up...
>

  Thanks for your "trip report" and comments, Barry. I sure wish I had
known you were coming out and we could have gotten together. I didn't
make any of the workshops but I went down and wandered the exhibition on
Wednesday. Seemed like it wasn't as large or as busy as other MTTs in
years past.

  I agree with you that the situation in WLANs isn't matching the
previous hype. I also found your comments about the FCC response
interesting.

  I think that all of this points out the need for amateurs to do
something on our own and not wait for chip sets or solutions from
commercial providers, however desirable they might be.

  However, there doesn't seem to be a lot of amateur design and
construction activity, at least as I perceive from those I email with as
a result of my web pages and activity here.

  Has anyone compiled a list of individuals and groups operating
 >=56Kbps amateur hardware, other than the Ottawa pages that is?

  I'm not sure what the impediment to building and testing simple RF SS
hardware is for so many. Perhaps there is some way to encourage this.
I'm pretty sure that we amateurs are going to have to put some hardware
on the air and do a lot of testing in order to even correctly understand
the best solution(s) for moderate speed networking. We need to somehow
work together more effectively. Do we need an AMSAT-like body for ss
and higher speed information systems? Or is getting a "quorum" of
hardware and developer types together impossible?

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|
| |
| http://www.tapr.org/~n6gn/index.html |

4. Re: [SS:365] Some news from the WLAN front...

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 3 Jul 1996 09:45:03 -0400

To: ss@tapr.org
Message-ID: <1DA8B480.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

>I suppose that this atmosphere of deregulation bodes well for increased
>use of SS in the amateur bands... on the other hand, a "market-oriented"
>approach to spectrum management doesn't sound too encouraging for the
>future of amateur radio, does it?

No, it doesn't. Whats also a concern is the consternation of the LEO people - they don't want to rule out the use of 2m band for satellite use! I was afraid this was going to happen someday...Big Money has a VERY Big Voice!!

>Anyhow, there's my report... discussion, anyone?

>Barry

73s de
Tony, KE4ATO

5. [SS:365] Some news from the WLAN front... -Reply

From: Elizabeth Lyle <elyle@fcc.gov>
Date: Wed, 03 Jul 1996 11:04:47 -0400
To: ss@tapr.org
Message-ID: <s1da55f3.019@fcc.gov>
Rendered body type: text/plain

Thanks ....by the way, the article that you gave me from B&C yesterday
should go in the weekly clips -- please send it over to Ira also. Thanks.

6. Re: [SS:365] Some news from the WLAN front...

From: Julian Fields <jfields@cisco.com>
Date: Wed, 3 Jul 1996 11:04:47 -0700
To: ss@tapr.org
Message-ID: <199607031804.LAA01279@harrier.cisco.com>
Rendered body type: text/plain

> than "horizontal". Although cost and performance issues are certainly

Cost is an issue. Look at the cordless spread spectrum phones.
Most cost $250. I just don't know why the price is so
high. Are the components that much more?
I saw a 900Mhz refurb advertised for $99, but are all
900Mhz phones required by law to be spread spectrum or
is this cheap because it's non-SS?

> standard in Europe (see http://www.etsi.fr/ecs/reports/stateart/bourin.htm).
> The FCC NII/SUPERNet NPRM (http://www.fcc.gov/oet/info/nii5ghz.html) may
> pave the way for HIPERLAN at 5.2 GHz in the US.

There is a danger that US companies will be left out
of the wireless lan market if HIPERLAN works out.

> product for unlicenced ISM band operation which has 2W into a 27 dBi

I hope the FCC will lower the power limit and require directional antennas
in this new band.
No need in broadcasting 360 degrees when WLANs would work with
directional antennas. Even if you had a 90 degree rather
than 360 degree transmitter antenna, you would cut down on interference
in the remaining 270 degrees. This would also help portables
power consumption.

7. Re: [SS:366] 915 MHz WaveLAN cards avail $199 ea

From: Jeff King <jeff@mich.com>
Date: Wed, 03 Jul 1996 19:37:03 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960703233703.006ee58c@mich.com>
Rendered body type: text/plain

At 09:52 AM 7/3/96 -0500, you wrote:
>It's come to my attention that 100+ of these cards
>are soon to be available. Not much chance of
>negotiating the price lower than this. Pls
>email direct if you're interested.
>

>best regards/bob K6KGS
>
>
>

Yes, in more then a few. What drivers/accessories come with them?

wb8wka

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

8. Re: [SS:367] Re: Some news from the WLAN front...

From: Greg Jones <wd5ivd@tapr.org>
Date: Thu, 4 Jul 1996 02:10:02 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607040710.CAA10952@tapr.org>
Rendered body type: text/plain

Hi Glenn,

> I'm not sure what the impediment to building and testing simple RF SS
> hardware is for so many.

Money, time, and energy. The folks interested in doing this are already doing it to some extent. Yourself, Barry, Dewayne, Robert, and others. This is no different from 56K technology or 9600 baud stuff (both of which have been available to be done since 1985).

Most don't have time to make the effort to tackle a new area, without having some initial hand holding.

> Perhaps there is some way to encourage this.

Yes -- we have to offer something to those interested in playing a starting place. Telling them what to read and showing them what has been done will have some impact, but if past experience is an indication -- more has to be done. Things that can be placed in the hand will have more impact. Then, many will take the additional effort to do other things.

We can't forget that typically only a very small handful of people lead a new technology. Transferability is what this is about. We have to get the opinion leaders involved -- now that we have the change agents in place and doing things. Without the opinion leaders being involved -- we will not see much change in this area.

> I'm pretty sure that we amateurs are going to have to put some hardware
> on the air and do a lot of testing in order to even correctly understand
> the best solution(s) for moderate speed networking.

I agree here. The Part 15 WLAN people don't have incentive to do anymore than what they are already doing. Why ? Because they are able to sell units with the technology they have. Why do better and higher cost units when you can sell the stuff you are making now. Take the money and run ?

> work together more effectively.

I agree here totally. That is one reason TAPR has this list setup and I hope with the effort of some, we can eventually use TAPR to disseminate information further into the radio community via the PSR, DCC, and eventually semi-kits -- to kick start the middle ground amateur.

RF stuff can't be done as kits if we want more than the people doing it now to be a part of the process (i.e. semi-kits). Items that are built and tuned and can then be tested and played with. Building blocks for getting individuals hands on the technology -- that then leads to more study.

This again ties into the lack of test equipment and knowledge to make a lot of this stuff work.

> Do we need an AMSAT-like body for ss
> and higher speed information systems? Or is getting a "quorum" of
> hardware and developer types together impossible?

Not sure what you are getting at here Glenn ?

Is TAPR not supporting this effort now that could not be further enhanced in the future ?

Please let me know if you see TAPR missing something in this area -- the organization is hanging it hats on doing and promoting SS into the amateur services.

I would hate for a group within TAPR to go off and start another organization for this purpose when one is already here and set up -- maybe just due to a lack communications.

Cheers - Greg, WD5IVD

President -- Tucson Amateur Packet Radio Corp

TAPR Office (817) 383-0000 | Internet: wd5ivd@tapr.org
---

9. Re: [SS:366] 915 MHz WaveLAN cards avail $199 ea

From: Thomas Barefoot <barefeet@ns.awanet.com>
Date: Thu, 4 Jul 1996 20:23:22 -0500 (CDT)
To: "Robert A. Buaas" <buaas@wireless.wdc.net>
Cc: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960704202244.8573A-100000@ns.awanet.com>
Rendered body type: text/plain

I would like to know if you have drivers available for these cards when run under BSDI unix.

On Wed, 3 Jul 1996, Robert A. Buaas wrote:

> It's come to my attention that 100+ of these cards
> are soon to be available. Not much chance of
> negotiating the price lower than this. Pls
> email direct if you're interested.
>
> best regards/bob K6KGS
>
>

10. Re: [SS:371] Re: 915 MHz WaveLAN cards avail $199 ea

From: Thomas Barefoot <barefeet@ns.awanet.com>
Date: Thu, 4 Jul 1996 20:27:54 -0500 (CDT)
To: Jeff King <jeff@mich.com>
Cc: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960704202709.8573B-100000@ns.awanet.com>
Rendered body type: text/plain

I would like to know more about how you are linked to the internet by ss, Jeff. Please e-mail me more info at barefeet@ns.awanet.com

On Wed, 3 Jul 1996, Jeff King wrote:

> At 09:52 AM 7/3/96 -0500, you wrote:
> >It's come to my attention that 100+ of these cards
> >are soon to be available. Not much chance of
> >negotiating the price lower than this. Pls
> >email direct if you're interested.
> >
> >best regards/bob K6KGS
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> >
> >
>
> Yes, in more then a few. What drivers/accessories come with them?
>
> wb8wka
>
> Regards,
>
> Jeff King

> jeff@mich.com
> Linked to the internet via spread spectrum
>
>
>

11. Re: [SS:367] Re: Some news from the WLAN front...

From: wb9mjn@wb9mjn.ampr.org
Date: Sun, 07 Jul 96 09:03:53 UTC
To: ss@tapr.org
Message-ID: <10628@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Barry, Glenn and Greg,

Here s my take on the Ham Radio developement.

Hams are end-users. They have something in mind they want to do, and they pretty much develope, and build for that purpose only. If they do not see that the effort is going to imediately result in the goal they have set, they don t do it.

Of course this is a generality, and is flawed in the ways all generalities are. But, on average, I think its true.

So, how does this effect SS development? With SS, I don t think we have layed down a specific usage, other than simplex style station to station communication. This can be done with a variety of NBFM gear.

There needs to be a something that SS does, that is not served by NBFM technigues, or not served well by NBFM technigues.

Another impediment to SS technigues is spectrum usage. But, we ve been thru that already, on this group. Suffice it to say, that Microwave bands would be better place to start, to avoid problems. And, other than Glen, i believe, on here, people cannot walk down a hallway, and into a room with synthesized sweeper, and vector network analyzer. These two items really make Microwave developement time efficient. Microwave bands demand RAKE recievers, and its unclear if RAKE recievers are practical in TTL IC level developement, or if they are built into any but proprietary chip sets out there. That is, access level Microwave radios would require RAKE technigues.

Here s an idea that might be a SS icebreaker in Ham Radio. Its not packet, its just digital voice. FEC Packet would be needed to use the technigue for packet. The band - 6 meters - them middle 2 Mhz of the band. Why is 6 meters not used as much as other bands. It interferes with TV, the duplexors are massive physically and economically, the antennas are large for mobile in-sallation, Mobiles in an urban enviorment experience strong noise, and de sense (channel 2 tv) sources. It seems to me that SS can improve on all these problems.

Broadband signals would not interfere with TV 2 receivers nearly as no-ticably. Indeed, most TV 2 viewers accept broadband power line interferance. Matched Filter DSSS technigues could be used to impliment a TDD (time domain duplex) technigue, eliminating duplexors from the system. Can t do much about antennas, with SS, tho, but HF ers use larger antennas anyway. FEC technigues could be used to reduce impulse noise problems. With modern first mixer technology, and processing gain reducing the desensing signal levels, desense from TV could be improved allot.

With 2 Mhz, the IS-95 system could be done. Or we could come up with our own. I like the STEL-2000a, myself. Its cheap, u could put one in a HT, and it has variable amount of processing gain, allowing for area selectable processing gain. That is, procssing gain coordinated on the level of user ship in a geographical area. But, i m no expert on DSSS.

This technigue would allow for repeaters to operate in the same spectrum, and even do hand-off. They would probably need Tom Clark's TAC (totally accur-ate clock), to do this, but hey, we have the technology.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

12. FreeWave (was Wavelan cards...)

From: Jeff King <jeff@mich.com>
Date: Sun, 07 Jul 1996 14:01:37 -0400
To: Thomas Barefoot <barefeet@ns.awanet.com>
Cc: ss@tapr.org
Message-ID: <1.5.4.32.19960707180137.006f1414@mich.com>
Rendered body type: text/plain

At 08:27 PM 7/4/96 -0500, Thomas Barefoot wrote:
>I would like to know more about how you are linked to the internet by ss,
>Jeff. Please e-mail me more info at barefeet@ns.awanet.com
>

I'm using a set of FreeWave DGR-115 presently in a point to point
configuration. These are frequency hopping spread spectrum radios
on the 902-928mhz band. Power output is +25dBm (400mw) and RX
sensitivity is -110 dBm@10-4 raw BER. Over the air speed is 173 kbaud
which spools down to 115 kbaud RS-232 connector. There are 115 frequencies
it hops to, and dwell time is on the order of 35ms. I'm running PPP
through them now. Measured latency of the radios is around 40ms.

Presently, I'm operating them under Part 15 rules. My link consists of
the following hardware. At the ISP (mich.com) I have a DGR-115 connected
to a vertical antenna at about 35 feet. The radio is connect to a LINUX
box running the PPP damon. I've also used it with a Livingston Port Master
in the past. At my office end, I have a 6 element Yagi at
about 40 feet. I'm presently just using Winsocks on a WIN95 box but plan
on linking my LINUX and/or my CISCO in. The link distance is about 2 miles
and is not line of site due to the 60-80 foot trees that are between
us. My throughput with a FTP (to the local host at the other end of the
link) is about 8.1 kbytes a second.

I've done some demos at computer clubs around the area also. With a 'back of
set' antenna I can get about a 1 mile range inside buildings (to the ISP).
To a car, about 3-4 miles. I've not done to many point to point tests but
the manufactuer claims 20 miles range. I think Dewayne Hendricks has run
a set of them 25 miles, but he has mountains :-). I'll be putting in a
11.7 mile K-12 link for dial-ups later this month in the thumb area of Michigan
and can report back on that (its flat, wooded and with some hills).

We've also used them on both the Ann Arbor hamgate (wb8tkl) and the Oakland
County hamgate (wb8wka). Worked well at the Ann Arbor hamgate but had some
problems at the Oakland County hamgate due to low antenna and terrain. You
need good coax, and a close to line of site path. They will penetrate trees
fairly well but won't go through the side of a hill (although if the hill to
were bare, you might get some knife edge).

I've also operated them in a multipoint configuration using a Livingston
Port master as the hub going to 4 different radios hooked to Macs and PC's
all running various flavors of Netscape. Performance seemed good.

BTW, I've spoken with the manufacturer about arranging a group buy of there
OEM board (http://www.freewave.com/dgro.html) which is almost the same as
what I have save the case and RS-232 level conversion. Depending on the
number interested, pricing could be $500 or less. Please e-mail be if your
interested.

Hope that answers your questions.

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

13. Re: [SS:376] FreeWave (was Wavelan cards...)

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Mon, 8 Jul 1996 06:27:28 -0700
To: ss@tapr.org
Message-ID: <v03007811ae06bbcad54f@[204.118.182.22]>
Rendered body type: text/plain

At 13:02 -0500 7/7/96, Jeff King wrote:
>I've done some demos at computer clubs around the area also. With a 'back of
>set' antenna I can get about a 1 mile range inside buildings (to the ISP).
>To a car, about 3-4 miles. I've not done to many point to point tests but
>the manufactuer claims 20 miles range. I think Dewayne Hendricks has run
>a set of them 25 miles, but he has mountains :-). I'll be putting in a
>11.7 mile K-12 link for dial-ups later this month in the thumb area of
>Michigan
>and can report back on that (its flat, wooded and with some hills).

That is correct. I have also been using the FW units in the SFO Bay area and have one link up that is 25 miles (Fremont to San Mateo). This result to me is quite impressive due to the greater amount of interference in the Bay Area on the 902-928 MHz band as compared to our test sites in Colorado.

-- Dewayne

--
~~~~~~
Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AOL: HENDRICKS
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854   !
~~~~~~

14. Re: [SS:372] Re: Some news from the WLAN front...

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Mon, 8 Jul 1996 07:52:32 -0800 (PDT)
To: ss@tapr.org (Greg Jones)
Message-ID: <199607081452.AA165327552@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Greg writes (in part),

> We can't forget that typically only a very small handful of people lead a
> new technology. Transferability is what this is about. We have to get the
> opinion leaders involved -- now that we have the change agents in place and
> doing things. Without the opinion leaders being involved -- we will not see
> much change in this area.

  I'm not sure I understand the specifics of this. Who are the change agents, are they the handful? Who are some representative opinion leaders? Are they local or nationally observed?

>
> I agree here totally. That is one reason TAPR has this list setup and I
> hope with the effort of some, we can eventually use TAPR to disseminate
> information further into the radio community via the PSR, DCC, and
> eventually semi-kits -- to kick start the middle ground amateur.
>
> RF stuff can't be done as kits if we want more than the people doing it now
> to be a part of the process (i.e. semi-kits). Items that are built and
> tuned and can then be tested and played with. Building blocks for getting
> individuals hands on the technology -- that then leads to more study.
>
> This again ties into the lack of test equipment and knowledge to make a lot
> of this stuff work.

  This seems a likely flow to me as well, but it certainly is a big task. Because the task (nebulous though it may be) is by nature less incremental than previous changes to amateur radio, it requires a great deal more to be in place before a critical mass is reached. Even then, I suspect that there is likely to be much less 'building' with the pieces than there is using. And there won't even be that using unless the available pieces really do sufficiently and economically solve the problem.

> > Do we need an AMSAT-like body for ss
> > and higher speed information systems? Or is getting a "quorum" of
> > hardware and developer types together impossible?
>
> Not sure what you are getting at here Glenn ?
>
> Is TAPR not supporting this effort now that could not be further enhanced in
> the future ?
>
> Please let me know if you see TAPR missing something in this area -- the
> organization is hanging it hats on doing and promoting SS into the amateur
> services.

  This was probably worded poorly on my part. I was considering the size of the task (mentioned above) and trying to think of a parallel for how or where large (and non-incremental) projects have been accomplished within amateur radio. AMSAT was the only one I could think of. Amateur packet radio, generically, has ended up becoming large but it has been

possible to grow it slowly.

  I think that wide area mid/high speed amateur networking along with satellites tend to require a lot to be in place before there is any payback at all. As Don mentioned, that kind of sustained effort and attention to a goal hasn't historically been a strength of the hobby. It is my understanding that even with the "flash" of satellite communications to focus contributiors (of all kinds) AMSAT has had a struggle to keep things moving.

  I am very appreciative of the effort that TAPR is making toward promoting SS and amateur networking. I don't see any other organization doing better or even as well.

  However, there appears to be a huge task here and I think it is essential that a common view of the goal be developed in order to avoid wasted and parallel effort. There have been several particular projects suggested already but where do they fit?

  I'm still not sure of TAPR's goal. Is it just to use SS, per se, for some/any kind of amateur communication? Or is it to build an economic information delivery system for amateurs using whatever it takes? Does it even have to be by radio? Is it to develop a new area for amateurs to experiment in? Is it a blend of these and other reasons and if so, which ones and what sort of blend?

  I am definitely too far off in the corner to have a clear perspective of what the goal should be so I'm not suggesting, I'm just trying to sort it out!

Glenn n6gn

15. Re: [SS:375] Re: Some news from the WLAN front...

From: Chris Dapples <ccdapple@wtpprod1.wtp.net>
Date: Mon, 08 Jul 1996 09:16:21 -0600
To: SS-Tapr <ss@tapr.org>, SS-Tapr <ss@tapr.org>
Message-ID: <9607081516.AA03385@wtpprod1.wtp.net>
Rendered body type: text/plain

Hi Guys,

> Hams are end-users. They have something in mind they want to
> do, and they
> pretty much develope, and build for that purpose only. If they
> do not see
> that the effort is going to imediately result in the goal they
> have set, they
> don t do it.

Don is right here. I know very little about Spread Spectrum except for what I have read in the ARRL Source Book. So far, the messages on this mailing list I find very intimidating. The jargon you guys throw
around is like a foreign language to me for the most part. I think most hams would be turned away from SS because of this.

Another point. Several years ago I started to work with 9600 baud packet satellites (goal orientated) and suceeded, because there were kits to make the components needed, ie, modems and trakbox. Some simple kits to get beginners started might be good for SS. I am pretty much focused on TCP/IP packet networks and could see where SS might be very helpful in this area. Multi connects to a central hub, each transparent to the others, would be very useful.

Finally, with technology getting more sophisticated every day, the average ham is being left farther and farther behind. Building equipment requires such expensive test equipment that hams like me are ruled out from doing anything useful. For example, I was interested is working on DSP techniques of analyzing weak signals from satellites and other extra-terrestrial sources. However, to be able to do this would require more than $35,000 worth of test equipment, plus a state of the art computer to handle the data. So, the ideas died on the vine so to speak. The fortunate hams who have access to universities and/or companies willing to let them use some of their lab equipment can probably make a go of such projects, while the rest of us can only sit and dream.

Chris Dapples
ccdapple@mail.wtp.net

16. Re: [SS:375] Re: Some news from the WLAN front...

From: ATVQ@aol.com
Date: Mon, 8 Jul 1996 11:50:58 -0400
To: ss@tapr.org
Message-ID: <960708115057_429611383@emout07.mail.aol.com>
Rendered body type: text/plain

AMen. I suggest you take the top 2 MHz of 6 meters, since the FM boys want 52.525, and the SSB/CW ends about 50.2. 73 Henry KB9FO

17. Re: [SS:377] Re: FreeWave (was Wavelan cards...)

From: ATVQ@aol.com
Date: Mon, 8 Jul 1996 11:50:52 -0400
To: ss@tapr.org
Message-ID: <960708115051_429611413@emout13.mail.aol.com>
Rendered body type: text/plain

I can provide a site at the top of Sears tower Chicago, if you want to experiment (provide your own equipment) 73 Henry KB9FO

18. Re: [SS:380] Re: Some news from the WLAN front...

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 08 Jul 96 11:04:46 UTC
To: ss@tapr.org
Message-ID: <10641@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Henry,

 I don t think its technically practical to go right to the band edge, next to a megawatt erp tv station allocation. Besides, the SS sidebands would cause reception interferance, too.

 For Megabaud packet(data, voice, video, etc) 440 is a must. 6 meters would only be easy to use for low data rate voice, video, due to the voice. Its not acceptable for data. Except in the mountains, away from power lines, and spark ignition generators/vehicles.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

19. Re: [SS:382] Re: Some news from the WLAN front...

From: ATVQ@aol.com
Date: Mon, 8 Jul 1996 21:30:14 -0400
To: ss@tapr.org
Message-ID: <960708213003_151574127@emout15.mail.aol.com>
Rendered body type: text/plain

channel 2 TV is 100 KW ERP, typically a 10-25 KW TX and low gain antenna. The TV set IF filter would not pass your signal, as the rolloff on the lower side is quite sharp to avoid adjacent channel (3 and up) interference. There is usually also a lowerside adjacent sound reject filter which adds to this. The most likely source of QRM would be signal strength, and since SS so far is low power, not likely to be a problem. Also since it is an itinerent albiet repetitive signal, at worst case it would be the appearance of ignition noise if it was above the noise floor of the TV. Try it! 73 Henry KB9FO

20. Re: [SS:379] Re: Some news from the WLAN front...

From: fperkins@onramp.net
Date: Mon, 8 Jul 1996 20:38:25 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607090138.UAA21614@mailhost.onramp.net>
Rendered body type: text/plain

Hi Chris,

I was able to get a dozen or so DSP-93 modems developed with a $750 o'scope (which I already had), a $25 shareware assembler, and a $200 - $300 worth of DSP development SW and text books.

(And, of course, Bob Stricklin's DSP-93 kit.) It does not cost
a fortune to do interesting DSP, RF, or SS amateur experiments.

Yes, things are more complex than they used to be. However, there
is a lot more technology integration and support information
around to help ... I got a lot of help on modem concepts from
friends such as Tom McDermont, Ron Parsons, Johan Forrer, etc.

The common denominator - they are all TAPR members.

SS has some interesting and unique properties. It is time
for amateurs to explore this communication mode. It is not
magic. In the year 1996, it is much less of a tehnology "jump"
from FM to SS than it was from AM to SSB in 1956.

Let the chips fly!!!

73 Frank WB5IPM

21. Re: [SS:366] 915 MHz WaveLAN cards avail $199 ea

From: Kevin Williams <kevin_williams@eee.org>
Date: Mon, 8 Jul 1996 22:11:43 -0700
To: ss@tapr.org
Message-ID: <199607090513.AAA21063@tapr.org>
Rendered body type: text/plain

At 09:52 AM 7/3/96 -0500, you wrote:
>It's come to my attention that 100+ of these cards
>are soon to be available. Not much chance of
>negotiating the price lower than this. Pls
>email direct if you're interested.
>
>best regards/bob K6KGS
>
>
I have tried to call you a couple of times, but no luck yet. If you get a
chance give me a call at (619) 946-0288.

I am interested in more than a few of the cards, and would like more details.

I hope to talk to you soon!
73
Kevin
--
Kevin Williams KN6UO
Internet - kevin_williams@eee.org
AX25 - KN6UO@KE6TXE.#SOCA.CA.USA.NOAM

22. Re: [SS:367] Re: Some news from the WLAN front...

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Tue, 09 Jul 1996 16:18:02 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19960709201802.00690778@mindspring.com>
Rendered body type: text/plain

At 10:42 AM 7/3/96 -0500, Glenn Elmore <glenne@hpsadr2.sr.hp.com> wrote:
>
>I think there is the possibility of something interesting being built out
of >the commercial networking products that are being developed.

There are interesting products at both the component and board/box level.

In December 93, W7SX (Robert Zavrel) gave a presentation to our company club
on the potential application of the Plessy DE6003 2.4GHz SS tranciever to an
amateur digital network at 625 Kbps. At the time he was an engineer at
Plessey in Scotts Valley. He had done his homework, but apparently didn't
get enough interest to gain momentum. Looked real neat to me. 625Kbps
would make ISDN look sick. The DE6003 was just sampling at the time, and I
don't know if it really became available.

I know that there is much more out there, for example the 900 MHz modules
that ALFA Inc. offers.

In March of 95 someone at Thorne EMI LPRS gave me some information on a
RS-485 serial interface tranciever they have developed operating at 2.45GHz
and capable of up to 1Mbps. It conformed to European Standard ETS 300 328.
Price was given as 488 UK pounds sterling (ex vat) in quantities 1 - 10.
Info can be found at Thorne EMI

With gain antennae these types of units could be good for several kilometers point-to-point. There is a possibility, if you get enough players, of putting together a fairly high performance network across a regional area.

How about we get together some sort of survey of what's available out there in the commercial marketplace as chip sets, trancievers, and also interesting R&D reports etc. and create a central set of pointers so potentially interested people can get some inspiration? If someone wants to add it to their existing web page that's great, or maybe someone can hang something up at TAPR, or I'll even volunteer to try to put up something on my mindspring account.

Any takers?

Lee W. Fry
lfry@mindspring.com
AA0JP

23. Re: [SS:386] Re: Some news from the WLAN front...

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Tue, 9 Jul 1996 16:03:48 -0800 (PDT)
To: ss@tapr.org (Lee W. Fry)
Message-ID: <199607092303.AA230643429@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Lee W. Fry wrote:

>
> At 10:42 AM 7/3/96 -0500, Glenn Elmore <glenne@hpsadr2.sr.hp.com> wrote:
> >
> >I think there is the possibility of something interesting being built out
> of >the commercial networking products that are being developed.

Not to be too picky but actually, I don't think *I* wrote that. At least I don't remember it or have it in my out file. What I *did* say on that day was:

   I think that all of this points out the need for amateurs to do
   something on our own and not wait for chip sets or solutions from
   commercial providers, however desirable they might be.

> How about we get together some sort of survey of what's available out there
> in the commercial marketplace as chip sets, trancievers, and also
> interesting R&D reports etc. and create a central set of pointers so
> potentially interested people can get some inspiration? If someone wants to
> add it to their existing web page that's great, or maybe someone can hang
> something up at TAPR, or I'll even volunteer to try to put up something on
> my mindspring account.
>
> Any takers?
>

I think that there are already some pages listing the offerings from wireless vendors.

http://snapple.cs.washington.edu:600/mobile/mobile.html#providers

comes to mind. Perhaps this is what amateurs will and should end up doing; forget the radio and construction part, buy hardware and put it on. If our goal is simply to run SS, this could no doubt do it. If we're trying to do something with *radio* ourselves then maybe we should be looking elsewhere. If we only want to network information in an amateur manner (whatever that means) and don't care *how* we do it, maybe we should be talking about how to string optical fiber.

I'm still interested to hear what people think the goal is.

Glenn n6gn

24. Re: [SS:384] Re: Some news from the WLAN front...

From: xbrucex <xbrucex@popmail.mcs.net>
Date: Tue, 09 Jul 1996 20:02:42 -0500
To: ss@tapr.org
Message-ID: <199607100103.UAA06365@Kitten.mcs.com>
Rendered body type: text/plain

Gang -
I totally agree with the 1956 SSB remark. I wish I'd said that. HAM RADIO IS ABOUT LEARNING WHILE HAVING FUN.

Bruce

At 20:52 7/8/96 -0500, you wrote:
>Hi Chris,
>
>I was able to get a dozen or so DSP-93 modems developed with a
>$750 o'scope (which I already had), a $25 shareware assembler,
>and a $200 - $300 worth of DSP development SW and text books.
>(And, of course, Bob Stricklin's DSP-93 kit.) It does not cost
>a fortune to do interesting DSP, RF, or SS amateur experiments.
>
>Yes, things are more complex than they used to be. However, there
>is a lot more technology integration and support information
>around to help ... I got a lot of help on modem concepts from
>friends such as Tom McDermont, Ron Parsons, Johan Forrer, etc.
>
>The common denominator - they are all TAPR members.
>
>SS has some interesting and unique properties. It is time
>for amateurs to explore this communication mode. It is not
>magic. In the year 1996, it is much less of a tehnology "jump"
>from FM to SS than it was from AM to SSB in 1956.
>
>Let the chips fly!!!
>
>73 Frank WB5IPM
>
>
>
>
>
>
>

25. Re: [SS:387] Re: Some news from the WLAN front...

From: Jeff King <jeff@mich.com>
Date: Tue, 09 Jul 1996 22:27:53 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960710022753.006b52ac@mich.com>
Rendered body type: text/plain

At 06:05 PM 7/9/96 -0500, Glenn n6gn wrote:

>comes to mind. Perhaps this is what amateurs will and should end up
>doing; forget the radio and construction part, buy hardware and put it
>on. If our goal is simply to run SS, this could no doubt do it. If
>we're trying to do something with *radio* ourselves then maybe we should
>be looking elsewhere.

The highest band I operated before I started experimenting with wireless
SS lan equipment was 440mhz. Since I have started doing this, I now own
UHF (900+2.4ghz) test gear, I have designed and built antennas for 900 mhz
and have worked with topo maps and link analysis programs for these same
bands. So I wouldn't totally dismiss using 'off the shelf' equipment as
no gain to the service. I've learned alot about RF engineering expermenting
with this equipment. Granted, I'm not yet at the stage were I can design a
SS radio, I'm certainly closer then if I'd not done anything.

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

26. Re: [SS:386] Re: Some news from the WLAN front...

From: Ralph Ward <rw@txcc.net>
Date: Tue, 09 Jul 1996 22:46:01 -0500
To: ss@tapr.org
Message-ID: <31E32779.2ECB@txcc.net>
Rendered body type: text/plain

I can archive and sponsor the page on a host available to me.
Ralph Ward KB5UAA

Lee W. Fry wrote:

> my mindspring account.
>
> Any takers?
>
> Lee W. Fry
> lfry@mindspring.com
> AA0JP

27. Re: Link Analysis

From: Jeff King <jeff@mich.com>
Date: Wed, 10 Jul 1996 20:30:18 -0400
To: Rick Whiting <rwhiting@winternet.com>
Cc: ss@tapr.org, netsig@tapr.org
Message-ID: <1.5.4.32.19960711003018.006fd9f8@mich.com>
Rendered body type: text/plain

At 06:51 PM 7/10/96 -0500, Rick W0TN wrote:
 >Jeff,
 >
 >What link analysis program do you use?
 >
 >73/Rick W0TN

The topo 'program' I use is a excel spread sheet I got off of
http://www.gate.net/~dlung/indexftp.html . Its got versions
for lotus also. I've used various link analysis programs but
around here (Michigan) its often hard to get a line of site
path. With the graph function of EXCEL, I can get a good
idea of the fresnel zones and I can play "what if's" with
antenna heights. Note, you do need a topographical map to
enter the data. I understand there are CD-ROM databases
with all the topographical data already in them but I
believe they are expensive ($2000+ ??).

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

28. Re: [SS:371] Re: 915 MHz WaveLAN cards avail $199 ea

From: Jerry Normandin <jerryn@ici.net>
Date: Wed, 10 Jul 1996 20:31:05 -0400
To: ss@tapr.org
Message-ID: <31E44B49.4803FD8B@ici.net>
Rendered body type: text/plain

Jeff King wrote:
>
> At 09:52 AM 7/3/96 -0500, you wrote:
> >It's come to my attention that 100+ of these cards
> >are soon to be available. Not much chance of
> >negotiating the price lower than this. Pls
> >email direct if you're interested.
> >
> >best regards/bob K6KGS
> >
> >
> >
>
> Yes, in more then a few. What drivers/accessories come with them?
>
> wb8wka
>
> Regards,
>
> Jeff King
> jeff@mich.com
> Linked to the internet via spread spectrum
What speed are these cards... are they 2MBS???????

29. Re: [SS:366] 915 MHz WaveLAN cards avail $199 ea

From: Igor Sviridov <sia@nest.org>
Date: Thu, 11 Jul 1996 18:40:30 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607112340.SAA23675@eagle.nest.org>

Rendered body type: text/plain

Quoting Robert A. Buaas letter:

> It's come to my attention that 100+ of these cards
> are soon to be available. Not much chance of
> negotiating the price lower than this. Pls
> email direct if you're interested.

hi, i would like to purchase 2 of those.
i'm TAPR member, if it matters.

> best regards/bob K6KGS

ps. i understand there is a ka9q driver and i've seen MACH :) driver.
do you know about any others? it seems i'll be willing to write a
FreeBSD driver...

--
igor

30. Re: [SS:393] Re: 915 MHz WaveLAN cards avail $199 ea

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Fri, 12 Jul 1996 02:31:34 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199607120231.CAA19044@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

> ps. i understand there is a ka9q driver and i've seen MACH :) driver.
> do you know about any others? it seems i'll be willing to write a
> FreeBSD driver...

I don't think there is a KA9Q driver as such, but there are NDIS and ODI
drivers, so you can use the packet driver interface with a suitable
shim. There is a WaveLAN driver for Linux which is included in the
kernel distribution, and the WaveLAN ftp site has drivers for a few
other flavors of UNIX. Ref: http://wavelan.netland.nl/.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

31. Re: [SS:389] Re: Some news from the WLAN front...

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 12 Jul 1996 13:19:15 -0800 (PDT)
To: ss@tapr.org (Jeff King)
Message-ID: <199607122019.AA038702755@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Jeff King wrote:

> The highest band I operated before I started experimenting with wireless
> SS lan equipment was 440mhz. Since I have started doing this, I now own
> UHF (900+2.4ghz) test gear, I have designed and built antennas for 900 mhz
> and have worked with topo maps and link analysis programs for these same
> bands. So I wouldn't totally dismiss using 'off the shelf' equipment as
> no gain to the service. I've learned alot about RF engineering expermenting
> with this equipment. Granted, I'm not yet at the stage were I can design a
> SS radio, I'm certainly closer then if I'd not done anything.

Jeff,
   Thanks for the thoughts. I'm particularly glad to hear of your
growing interest and experimenting in RF. Growth in previously
unvisited areas is pretty much at the core of what I personally most
value about amateur radio, though it is definitely not the only aspect
of the hobby. I came from the RF side, vhf SSB (1960's), weak signal,
meteor scatter, EME and 10 GHz DX into the computer and networking
realms where I've learned a lot. I'm not a network or computer
scientist but, like you, I have some tools and knowledge and I am closer
now than if I'd not done anything. Amateur radio is certainly a great
'playground'.

   In my previous post, I wasn't dismissing using off-the-shelf hardware
at all. Rather I meant to list it as one possible means to a goal. If
we are not particularly focussed on building radio/RF, per se, then
using existing Part 15 equipment might be a reasonable approach. But it is,

I think, a very different approach from designing and implementing our own system and I think there are some pretty profound differences in what we would or could achieve, depending on our approach and our goals. That was what I was trying to say in the previous post. In addition to

(1) doing our own RF and system design
(2) using Part 15 or other commercial implementations

there is the additional possibility of

(3)punting RF entirely and figuring out how to get *lots* of bandwidth with, say, fiber.

(3) wouldn't be radio but it might offer a result that is still relevant to the time and culture.

Building an effective, efficient higher performance information infrastructure is a serious task. I don't believe it can be accomplished without pretty high level design and a concerted effort by a large number of amateurs. A good number of wireless startups have already failed in a similar attempt. I don't believe that amateur radio is going to fare much better without clear goal setting and high level attention to implementation.

If we are content with a "me too" approach; adapting commercial hardware and architectures for amateur use, I don't think the result can be particularly competetive with the commercial wireless systems which will eventually result. Maybe this is OK, it does still let hams "play" in the wireless networking arena, to a degree, but it is different from what might happen if we all worked together to build something of our own. Perhaps this degree of cooperative effort isn't even possible.

It seems to me that many hams are primarily looking for a lower cost and more flexible alternative to an ISP, rather than desiring to create something new/better within amateur radio. From that viewpoint, any solution, Part 15 or amateur-created will probably suffice. However, I don't believe that those individuals are likely to be "in it for the long haul" that a roll-our-own system requires. And if there isn't sufficient support for more than incremental changes on what currently exists, I don't think we can expect to ever have a "competetive" system for amateur use. It seems to me that amateur reuse/modification of h/w and s/w designed for a commercial system isn't likely to provide a better/faster/cheaper system than the one from which it was spawned. This is particularly true of a distributed resource like a wide area network where much of the value is in the system design.

If amateurs are to be successful in building hardware, software and systems that are meaningful in the present 'information age', I think it will be because we've cooperated and harnessed our strengths. One strength I believe we have which perhaps many of the commercial ventures haven't had is our physical diversity. Potentially we have site and skill resources spread over a lot of the world. Harnessing this could be a great advantage. If we don't take advantage of our strengths I have a hard time seeing how we can do anything better than any other consumer, even if we do mild adaptation of existing systems.

I find it interesting that I have consistently had more 'hits' on my web pages associated with building 800-950 MHz antennas than in all the other highspeed uhf and microwave, FSK or spread hardware combined. I don't know for sure but I suspect this is from people wanting to extend cell phone range. Somehow I doubt that these are all hams.

If all we as amateurs are able to do to with SS is adapt existing systems I don't expect we will be able to offer anything which is particularly attractive in the context of of other systems which are available. That doesn't sound like a formula for success for amateur radio even though it might be interesting to a few of us.

I expect to continue work on L3TNCRF just because I'm interested in making a lowcost general purpose transceiver for moderate information rates and in using SS to mitigate multipath QRM. But perhaps neither this nor other amateurs' projects like it, h/w or s/w, will ever amount to much more than fun local projects.

Thanks again for your thoughts.

Glenn n6gn

32. Re: WaveLan drivers -was 915 MHz WaveLAN

From: clearbrook_technical@mindlink.bc.ca (Fred Kehler (ve7ipb))
Date: Fri, 12 Jul 1996 15:56:10 -0700
To: ss@tapr.org
Message-ID: <v01510104ae0c8857ffff@[204.174.238.2]>
Rendered body type: text/plain

Hi, i do have a dos based packet driver for the wavelan card that i have used with jnos and seemed to work ok, i got it from AT&T tech support, about 1-1/2 yrs ago, if anyone needs it mail me and i can ftp it up somewhere.....

>
>> ps. i understand there is a ka9q driver and i've seen MACH :) driver.
>> do you know about any others? it seems i'll be willing to write a
>> FreeBSD driver...
>
>I don't think there is a KA9Q driver as such, but there are NDIS and ODI
>drivers, so you can use the packet driver interface with a suitable
>shim. There is a WaveLAN driver for Linux which is included in the
>kernel distribution, and the WaveLAN ftp site has drivers for a few
>other flavors of UNIX. Ref: http://wavelan.netland.nl/.
>
>Barry
>

33. Re: [SS:378] Re: Some news from the WLAN front...

From: Greg Jones <wd5ivd@tapr.org>
Date: Sat, 13 Jul 1996 18:10:08 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607132310.SAA06519@tapr.org>
Rendered body type: text/plain

Are you sitting down with a cool one -- get ready, this is a long one :-)

> Glenn writes,
>
>> Greg writes (in part),
>
> > We can't forget that typically only a very small handful of people
> lead a > new technology. Transferability is what this is about. We
> have to get the > opinion leaders involved -- now that we have the
> change agents in place and > doing things. Without the opinion leaders
> being involved -- we will not see > much change in this area.
>
>   I'm not sure I understand the specifics of this. Who are the change
> agents, are they the handful? Who are some representative opinion
> leaders? Are they local or nationally observed?

This is all based on theory regarding how change is brought about in information and technology societies. Everett Rogers (1982), published a land mark book on the subject that deals with how innovation precipitates in what we term a 'society.' The phrases above are the one used in this book and in the field of study now.

After you read the materials, it makes a lot of sense.

Let me give some definitions:

Before I start, keep in mind, that people can be all different aspects of the following categories. No one is just one or another. Depends entirely on the context the person is involved in.

Change Agent: A person who is at the leading (or better yet bleeding) edge. Takes the time and effort to understand, develop, design, create, learn, etc the new 'technology'. This person then actively promotes the new 'technology' at conferences and anywhere else someone will stop and listen :-).

Opinion Leaders. These are the people that buy into what the Change Agents are saying and doing. The person that attends the conference and goes home with some new concept that can be passed along or used with their group (i.e. tribe/clan). To be an opinion leader others must also listen and hopefully follow. Some, very few, are both Change Agents and Opinion Leaders. As the name implies, the Opinion Leaders lead. However, the information or technology presented buy the Change Agent has to be in a form that is both usable and portable in nature -- while also being relevant to something the Opinion Leader wants to accomplish (i.e. motivation and attention = learning). Once they think that the new 'technology' can be

done and they can get their hands on the technology, they will then do something with it. 'Buying into the technology' is a phrase that comes to mind.

Everyone else :-) There is a better definition here, but I am not in Austin, so I don't have the book handy to look it up. Basically everyone else follows the Opinion Leader's vision or what they are doing.

The entire point of this theory is that there is a flow to the introduction of new technology. You can either plug away and hope that in time you win and the technology you were working on gets adopted and used. Or, you can understand the dynamics of change and work on getting others to buy into what you are doing so that change is precipitated in a quicker manner. 5% of the battle is the development of the new technology, the other 95% is technology transfer into the community as a whole. Since we are involved in the up front development work, it appears to us that 90% of the work is in the new technology development :-)

To date, while a lot of the SS stuff has been 'nifty keen', the typical Opinion Leaders in their areas have not seen it to be realistic to do. That is changing and is apparent from the activity in the overall amateur radio community and on this list.

This is changing because several of us are talking and working with national and regional Opinion Leaders explaining what could be happening. As Change Agents we are painting a picture of the future. Telling stories about the perfect future -- where we all set on a national network using SS local loop access along with wireline networking for regional connectivity -- which is one possible future. What SS voice systems could be doing in our over occupied and under utilized amateur radio frequencies. Etc.

Opinion Leaders fill another important niche. Take for instance all the flak related to SS on the amateur radio bands any number of us get (weak signal operators, EME, repeaters, etc). While, we as Change Agents, can turn blue in the face trying to convince certain individuals in the hobby, it only takes one Opinion Leader who turns out to be a friend of the person against the technology to convince them that maybe it is not all that bad after all. Like the ability to operate even weaker signals or get EME with a lot less antennas and power. Opinion Leaders change opinion. Not just a small group, but at different stages everyone is an Opinion Leader.

Enough of Roger stuff :-) I hope it makes a little more sense.

> > > I agree here totally. That is one reason TAPR has this list setup
> and I > hope with the effort of some, we can eventually use TAPR to
> disseminate > information further into the radio community via the PSR,
> DCC, and > eventually semi-kits -- to kick start the middle ground
> amateur. > > RF stuff can't be done as kits if we want more than the
> people doing it now > to be a part of the process (i.e. semi-kits).
> Items that are built and > tuned and can then be tested and played with.
> Building blocks for getting > individuals hands on the technology --
> that then leads to more study. > > This again ties into the lack of test
> equipment and knowledge to make a lot > of this stuff work.
>
> This seems a likely flow to me as well, but it certainly is a big
> task. Because the task (nebulous though it may be) is by nature less
> incremental than previous changes to amateur radio, it requires a great
> deal more to be in place before a critical mass is reached. Even then,
> I suspect that there is likely to be much less 'building' with the
> pieces than there is using. And there won't even be that using unless
> the available pieces really do sufficiently and economically solve the
> problem.

Yes Price is everything. Amateurs by nature or frugal (might I say cheap :-)

But like any project, you have to start some place. Nothing every really starts big. You have to start small and if it is good and the process is done correctly many will buy into it.

Critical mass is the tricky thing. Really we only need a handful of sites and individuals to generate the necessary critical mass. I have already been working on this informally. We can easily agree without the necessary infrastructure or philosophy in place, that people can 'buy' into, then there is no purpose for the radios we are talking about doing. Chicken and Egg problem.

I have already begun to stir the coals on this issue. While I don't have an answer, what I am doing is starting to collect a group of interested

Individuals (Opinion Leaders in their own areas) who understand the issues
and who might be interested in developing and implementing the guidelines
for the delivery of high-speed local loop access with regional/national
connectivity. A regional/national network scheme based on High-Speed SS
radios is dependent on a philosophy that others can see in place and one
that they can feel good about being a part of.

> > > Do we need an AMSAT-like body for ss > > and higher speed
> information systems? Or is getting a "quorum" of > > hardware and
> developer types together impossible? > > Not sure what you are getting
> at here Glenn ? > > Is TAPR not supporting this effort now that could
> not be further enhanced in > the future ? > > Please let me know if you
> see TAPR missing something in this area -- the > organization is hanging
> it hats on doing and promoting SS into the amateur > services.
>
>   This was probably worded poorly on my part. I was considering the
> size of the task (mentioned above) and trying to think of a parallel for
> how or where large (and non-incremental) projects have been accomplished
> within amateur radio. AMSAT was the only one I could think of. Amateur
> packet radio, generically, has ended up becoming large but it has been
> possible to grow it slowly.

Project management is the issue here -- the size of the task can either be
made manageable or kill you trying to manage it. I don't think we can
compare what we are talking about here to the likes of building a satellite.

What size task do you see this as Glenn ?

If we break up the tasks correctly, the actual implementation falls as part
of the regional responsibility. Thus, we don't really need a large body of
support at the national level. The concept is Retail vs Wholesale knowledge
distribution. If we try to manage anything other than the creation of the
technology at the national level -- we are in for problems. The development
of hardware and software, while a daunting task -- will be a small part of
an entire integration of some set of technology into the amateur community
-- that is if we are successful at all in doing something. It could easily
be the case -- where something else comes along -- that gets implemented
instead of the project(s) that were in the works. Say for example, NI2 5
gig equipment that everyone begins using ... because of price...who knows.
The entire approach has to be unstructured to some degree to allow the flow
of new concepts and approaches to be accepted into the plan, not excluded.

I see this as a series of small events:

        Like getting RM-8737 concluded to allow us to use
        existing Part 15 units in the bands and to allow real SS codes to be
used
        and all the other reasons that RM-8737 was started.

        Like getting the already done testing published
                Near/Far, Noise Floor, etc.

        Like getting OEM units into the hands of amateurs

        Like creating a national/regional networking philosophy
        for groups to be a part of and buy into the vision of SS

        Like spreading the word more (at least 60db process gain :-)
        and much more education like Steve Bible's book on SS he is working on
        while is at sea (USS Maryland)

        Like eventually having someone mfg radios that meet our needs
        within the amateur community

        Like .....

        As we bring in the regional groups wanting to participate in doing
stuff, we make sure that the mechanism is in place to allow growth at the
regional level. Many of the issues past those of a few hardware and software
issues, become very local and   regional in scope anyway.

All these are small projects that lead to a vision. The point to this
approach is that it is flexible to meet the demands of amateur radio. That
is to say -- things happen unpredictably at times. You have to have a very
open management style and good communications to take advantage of the
events that appear. Like someone showing up with a design ready to go.

>   I think that wide area mid/high speed amateur networking along with
> satellites tend to require a lot to be in place before there is any

> payback at all. As Don mentioned, that kind of sustained effort and
> attention to a goal hasn't historically been a strength of the hobby. It
> is my understanding that even with the "flash" of satellite
> communications to focus contributors (of all kinds) AMSAT has had a
> struggle to keep things moving.

I don't agree with this. Again, this is a perspective issue. In certain parts of the hobby and in certain areas of the US there has been sustained effort to do things. Like I always try to point out -- amateur radio is different (at least on the VHF/UHF/SHF bands) in every 50 mile radius.

It really does depend on where you are and what your local resources are. We have the infrastructure in place now for regional/national intra-networking to happen. It is just a matter of choosing a few critical sites to grow and design a philosophy that can be spread further -- 1) provide a common and low-cost solution for high-speed user radio interface and 2) provide a philosophy for buying/participating in a national intra-network strategy.

Amateur radio has been living, in many areas, off of network resources deployed in the mid 80's. It is time to either rebuild the infrastructure with new technology or allow the stuff we have now, old as it may be, to be replaced with commercial Internet and Part 15 devices. Why use Part 97 ? Well -- my answer is easy. To either be learning something or having fun. Up till now, the education issue regarding SS under Part 97 has been where most of the activity has been, which is typically much smaller these days then the having 'fun' group. Thus, we have to move the technology we have available to us from the 'takes a lot of skill, knowledge, and equipment to make it work stage' to something as simple as plugging an ethernet connection into one side and having RF coming out the other end.

Pete Eaton, in the 80's, had the right package in mind with the Packet Radio project. Just that the project team never really materialized to make it happen -- plus 9600 even then was probably not enough of a jump in performance to make it look attractive in price.
>   I am very appreciative of the effort that TAPR is making toward
> promoting SS and amateur networking. I don't see any other organization
> doing better or even as well.
>
>   However, there appears to be a huge task here and I think it is
> essential that a common view of the goal be developed in order to avoid
> wasted and parallel effort. There have been several particular projects
> suggested already but where do they fit?

Parallel effort is not all that bad. Yes - there is a lot to do, but again this is amateur radio. Having parallel things happening means there are alternatives and additional research that can happen to back other systems up. Parallel development also means that if someone has to actually work for a living, changes jobs, or gets married then we still have a potential for conclusion.

We want to make sure everyone is communicating about what they are doing, so research and knowledge can be pooled, but when learning something -- sometimes the only way to learn it is to do it yourself. So, I expect a lot of duplication with people experimenting with different commercially available radios, I expect people to be redundant in networking combinations and testing, and I expect people to not communicate about what they are doing. The last one is the one that always worries me the most. Amateurs hardly ever publish what they have done after they do it -- so others can at least build on that knowledge. I believe Web pages are changing that somewhat --- but it sure doesn't hurt to put stuff in the ARRL/TAPR DCC and other places and to attend the major amateur conferences. For as much e-mail and other communications going on -- having those face-to-face meetings and working in person once or twice a year just can't be replaced. All the research regarding electronic communications still shows that periodic face-to-face meetings help to heighten the overall communications.

Anyway, we shouldn't be approaching this like a Fortune 500 company, but like people trying to have fun and learn something along the way. I have always felt that if you meet those two goals then what ever you have spent your time working on has been successful. I probably would go nuts as TAPR President if I tried to do anything else. If you set your goals to changing the face of amateur radio -- then I would get prepared for failure. There is just to much inertia in the current hobby to make a lot of wide spread changes. However, we can effect what we do within the hobby and over time we might be able to add a lot to an area of amateur radio that does not get a lot of attention, 'That of improving the radio art.' SS brings that to the table in Spades. We have a real opportunity to make a contribution to the science that many of the Part 15 and other companies are not focusing on

because they are focused on profit....not research. We can really bring
this back up with a little work.

>   I'm still not sure of TAPR's goal. Is it just to use SS, per se, for
> some/any kind of amateur communication? Or is it to build an economic
> information delivery system for amateurs using whatever it takes? Does
> it even have to be by radio? Is it to develop a new area for amateurs
> to experiment in? Is it a blend of these and other reasons and if so,
> which ones and what sort of blend?

TAPR has several short and long term goals. Many of these will be appearing
in the statement of purpose that the Board will be reviewing shortly and
discussing regarding the direction of TAPR and SS.

Short term is to get deliverables targeted and into production. This
process began last October in Washington DC with the FCC regarding SS issues
(if you hadn't read we have placed a top law firm in DC on retainer).
Getting Steve Bible's intermediate level book written, reviewed, and
published. Get TAPR working with Part 15 mfgs about OEM possibilities via
TAPR into the amateur radio community. And there are several others...like
helping this SIG grow, working on additional information dissemination in
the future at the DCC and other events, etc etc.

Long range -- we are really talking about a paradigm shift in the way
amateur radio operators and other users of the spectrum operate. I am sure
you realize this. We have to develop communications systems within the
amateur hobby that don't interfere where we are secondary users (i.e 219 and
other frequencies) as well as don't interfere with other devices where we
are primary.

Can you imagine what the FCC will do one day if we start using older
technology that could wreak havoc with the existing Part 15 stuff? How many
grandmas does it take complaining that they can't use their phones before we
become secondary on those frequencies, so that we would have to worry about
the interference issues.

We are going to be living in an age of spectrum crowding -- if everyone can
make money with RF devices -- thus if we don't develop system that can allow
us to do our thing without interfering, then amateur radio will be further
displaced from chunks of frequencies over the course of the future.   There
is the possibility in this area of research that breaks the old paradigm
mold. Limited spectrum becomes a thing of the past -- hate to hear when
Congress others figure out that technology could take away there current
cash cow -- however full access for education and the public citizen at low
affordable cost becomes a reality with inexpensive non-crowded spectrum.

We start with making SS technology for high-speed data affordable as a long
range goal and because that is something people are now prepared to buy into
--- they have gotten a taste with their dial-up Internet access. There is
nothing stopping amateurs from being able to have networks that provide much
higher-bandwidth operations than capable over bandwidth limited telephone
circuits. The only thing stopping us is ourselves.

Thus, to make this happen the radios are not the only part of the equation.
A solution has to be made available that most any amateur radio operate can
'buy into' as a part of the whole. We can't get everyone, so we at least
target the people we want to talk to -- most of us that are on here as well
as other regional groups that are hanging on by a thread waiting for
something to kick start them again as groups.

Once we have been successful there, we begin to look at voice system and
other SS systems than can really benefit amateur radio in other areas. That
is -- if someone hasn't already done something. We are all aware of the
problems with voice repeater coordination. In places in the US, you have to
wait years to get a repeater. Why ? Because we live in a paradigm that says
that the freqs are occupied, thus that means that they are all utilized.
But we know that this is not the case. I am preaching to the choir here --
so I'll skip the rest of this thought :-)

Who knows what the basic building blocks will enable other amateurs to do --
once something is out there to get them started.

In the end though -- it all comes down to money. If we could afford to
purchase all the necessary components to do testing and then
cost-optimization, we could do a hell of a system with the knowledge we have
on tap from the last 10+ years of trying to make our other systems work. If
we can't purchase the development -- then we look at individuals bringing
technology to the table to be done...which is a much longer development
cycle.

Thus, what TAPR brings to the game is an organization dedicated to moving forward on the issue of SS within amateur radio. That is important. As many of us know -- the overhead of disseminating information can now be done pretty easily with the Internet -- that is to the 50% or so of amateurs currently on (50% might be high also). However, doing technology transfer in the way of equipment is a lot more difficult. Breaking out of local/regional perception (NIH) is difficult. All these requires an organization that bring the diverse regions and individuals together and fosters development and communications.

> I am definitely too far off in the corner to have a clear perspective
> of what the goal should be so I'm not suggesting, I'm just trying to
> sort it out!
>

No problem Glenn. If anything, we have goals and plans but they are so new we are still developing them and making sure the word gets out. It has only been over a year since I felt that TAPR should be hanging its hat on SS research, development, and education. I knew it for a fact when I attended the Long Beach meeting a year ago Sept. The TAPR Board began to buy into the concept at the Fall BoD meeting in Dallas last Sept. Then really making the commitment at the Dayton BoD meeting just a few weeks ago. It takes time and effort to generate new directions within an organization and then be in a position to articulate them meaningfully. That process has begun and I feel certain will continue for some time to come.

The critical mass to makes things happen is active within TAPR now. I see some big things on the horizon both short term and long term and the future looks exciting from where I am sitting. I would hope what many started years ago and what TAPR is taking active steps towards now can all come together to work towards common goals -- that of making practical SS operations a reality in the amateur radio bands.

I hope this message has not drug out to long. Lots to discuss in the one message.

Back to my dissertation now.

Cheers - Greg

P.S. As a side note to everyone reading this -- are you an ARRL member ? Have you sent e-mail or called your ARRL Director and let him/her know you are in favor of the league proposal on RM-8737. Do so! They really need to hear from some of the people that think that the RM is a good thing, instead of what they hear a lot of -- it is EVIL :-) As a mode, SS interested amateurs are falling down on petitioning our local leadership within the ARRL about the issue we are discussing here. Anyway ....

34. Re: Some news from the WLAN front...

From: wb9mjn@wb9mjn.ampr.org
Date: Sat, 13 Jul 96 18:27:47 UTC
To: ss@tapr.org
Message-ID: <10662@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Barry, Jeff, Glenn, Greg, and ?

The Internet's success is a plus and minus. It draws many people out of packet radio, and wireless commercial WAN's for that matter. But, its also a challenge for us to start doing what the old wireless microwave people did, but with a ham radio versatility. Without near total information capacity from the antenna/radio/time/Bandwidth/area resource, the capacity of packet radio is insuficient for what is rapidly becoming the everyday expectation of data communication.

The keyword is "versatility". Without a versatile radio system, Anyham has a big hill to climb, and Anynonham can not even get his questions answered by Anyham. Lets use 9600 as an example. Right now, D4-10s are not readily available, and the other cheap alternative is 2 watts. This is not too useful for omnigain UHF. And even if one goes out and buys this equipment, most packet infrastructure is useless to it, since 9600 baud user access has not been a general policy of packet clubs. Not very versatile, and yet this is about the absolute minimun that s useful for networked peer to peer communications.

We have to avoid this in the next system. We have to have a system that

allows Anyham to buy it, and be networked. It has to be HF like in its imediate useability. Even more imediately useable than VHF voice. Organisationally implimented infrastructure can only add to network performance, not be the make or break of networkability.

Greg, even a good system doesn t always get a chance in Ham Radio. So, allot of what ur saying doesn t neccassarily work in Ham Radio. For those idea to work, the new and different method has to be for an existing goal. In Ham radio, the goals we are after are too new to be permitted by everybody who can have an effect on our systems. Within a group, with ham radio, say packet radio, a better way to do something will win out, as long as it stays within the packet radio group. But, if it is objectionable to somebody outside of packet radio, it really doesn t have much of a chance, in Ham Radio. Its this "non-linearity" for want of a better term, which has held back allot of technically successful , better ways.

I think we need to straddle the Part 15 / Ham Radio fence. If somebody in Ham Radio starts to sand bag, we just become Part 15 ers. And if the Part 15 rules change, we are back to being hams. Its usually just a matter of a small qsy for SS gear. A good freind of mine , who runs a buisness selling 9600 baud stuff, had a large order from a guy in Indianapolis. Almost imediately arriving back home from the hamfest where he had sold the equipment, this guy in Indianapolis had shipped the stuff back, demanding a refund. His reasoning was that Indianapolis it was not useable. If my freind would not have had the cash on hand to cover this, it would have been a problem. Indeed, he could have sold the equipment to other people, as well. And thus the episode was a lost profit. This to me, seems to have been the real goal of the guy from Indianapolis.

A versatile system avoids allot of this. One just operates around trouble.

I do not think that there is a band wide enuf to impliment 60 dB processing gain, for near 1 MB data rates. Also, somebody said a while ago, that the prevailing opinion is that for 600 dollars, 56 KB was not fast enuf. My guess is that for 1000, ten times 56 kb, or a little more, would be. Using QPSK for modulation, the 10 Ghz band is limited to 500 baud, or thereabouts, with 60 dB processing gain, right ? This would be great for weak signal work, but what about WMAN Ham networks?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

35. The 'WAVE'

From: Jeff King <jeff@mich.com>
Date: Sat, 13 Jul 1996 23:31:31 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960714033131.006fa570@mich.com>
Rendered body type: text/plain

Has anyone on the list ever worked with some Part 15 equipment from a company out of Florida called "The Wave"? It appears to be ATT Wavelan 2.4ghz cards.

I need to run some performance tests on a link next week using this gear, and was wondering if anyone had some hints on this specific model (Wavelan 2.4ghz).

Any problems found with these boards would also welcomed.

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

36. Re: [SS:397] Re: Some news from the WLAN front...

From: Steve Sampson <ssampson@othello.tinker.af.mil>
Date: Sun, 14 Jul 1996 08:11:35 -0500
To: ss@tapr.org
Cc: postmaster@arrl.org
Message-ID: <31E8F207.79A1@othello.tinker.af.mil>
Rendered body type: text/plain

Greg Jones wrote:

[book deleted]

> P.S. As a side note to everyone reading this -- are you an ARRL member ?
> Have you sent e-mail or called your ARRL Director and let him/her know you
> are in favor of the league proposal on RM-8737. Do so! They really need to
> hear from some of the people that think that the RM is a good thing, instead
> of what they hear a lot of -- it is EVIL :-) As a mode, SS interested
> amateurs are falling down on petitioning our local leadership within the
> ARRL about the issue we are discussing here. Anyway ....

As I read it, the ARRL membership is voting for standing still. They
remind
me of a deer in the road, confronted by a bright light. I believe they
are
taking the attitude of Codeless-1. That is, they are fat enough with
money
to sustain themselves and their PAC issues. The issue that caused
Codeless-2
was the FCC chopped off some spectrum. The deer in the road moved an
inch.
Listening to the ARRL told us that the world was going to end if
Codeless
heathen were allowed licenses. We all bought that and replied Amen.
Then
when the FCC chopped off spectrum, we saw that the ARRL position was
wrong.
That this government agency has the power and will to reallocate
spectrum of
a dying or non-progressive user base, requires that we not make that
mistake
again. If the ARRL blocks SS, or limits it to a narrow segment, I think
it
will turn out to be another Codeless-1 fiasco. There are no sacred
modes in
my book. Those members who vote for standing in the road are just being
selfish (I got my frequency--to hell with everyone else). I predict
that we
will still be using 1.2 kbps 10 years from now, and the ARRL will then
be
ready for Spread-Spectrum-2 after the FCC chops off all of UHF and
above.

I think the rules should read: No station shall transmit on any
frequency for
more than 500 ms, unless operating Spread Spectrum Direct Sequence.
What that
means is that all other transmissions will be Morse Code or Frequency
Hopped
Spread Spectrum. This rule shall apply to all Part 97 band segments.
Use
of AM or FM is strictly forbidden (AM includes SSB, DSB, etc). That's
my
position. I think TAPR should produce a protocol paper on how this
system
would work. For next years scholorship competition, the candidate will
write
a thesis on the protocol and operating techniques for a spectrum
allocation
in which 90% of the users will operate in FH or DS (the rest supposedly
working CW or jamming).

--
Steve
"Shall we Jump, or move an inch, we will probably be killed in any
case."

37. Re: [SS:400] Re: Some news from the WLAN front...

From: Jerry Normandin <jerryn@ici.net>
Date: Sun, 14 Jul 1996 16:49:07 -0400
To: ss@tapr.org
Message-ID: <31E95D43.21A561BE@ici.net>
Rendered body type: text/plain

Some mentioned:
>
> As I read it, the ARRL membership is voting for standing still. They
> remind
> me of a deer in the road, confronted by a bright light. I believe they
> are

> taking the attitude of Codeless-1. That is, they are fat enough with
> money
> to sustain themselves and their PAC issues. The issue that caused
> Codeless-2
> was the FCC chopped off some spectrum. The deer in the road moved an
> inch.
> Listening to the ARRL told us that the world was going to end if
> Codeless
> heathen were allowed licenses. We all bought that and replied Amen.
> Then
> when the FCC chopped off spectrum, we saw that the ARRL position was
> wrong.
> That this government agency has the power and will to reallocate
> spectrum of
> a dying or non-progressive user base, requires that we not make that
> mistake
> again. If the ARRL blocks SS, or limits it to a narrow segment, I think
> it
> will turn out to be another Codeless-1 fiasco. There are no sacred
> modes in
> my book. Those members who vote for standing in the road are just being
> selfish (I got my frequency--to hell with everyone else). I predict
> that we
> will still be using 1.2 kbps 10 years from now, and the ARRL will then
> be
> ready for Spread-Spectrum-2 after the FCC chops off all of UHF and
> above.
>
> I think the rules should read: No station shall transmit on any
> frequency for
> more than 500 ms, unless operating Spread Spectrum Direct Sequence.
> What that
> means is that all other transmissions will be Morse Code or Frequency
> Hopped
> Spread Spectrum. This rule shall apply to all Part 97 band segments.
> Use
> of AM or FM is strictly forbidden (AM includes SSB, DSB, etc). That's
> my
> position. I think TAPR should produce a protocol paper on how this
> system
> would work. For next years scholorship competition, the candidate will
> write
> a thesis on the protocol and operating techniques for a spectrum
> allocation
> in which 90% of the users will operate in FH or DS (the rest supposedly
> working CW or jamming).
>
> --
> Steve
> "Shall we Jump, or move an inch, we will probably be killed in any
> case."
Well.... That's why I never bothered getting my ticket. In order to
use the frequency I wanted I had to pass 150 words per minute on morse
code.... imagine that. Sure it's nice to know morse code, it could help
you if your in a bind, but also the person on the other end needs to
know it as well. When you are in an emergency situation are you going
to signal an airplane with a mirror at 150wpm? Hell no! You will send
... _ _ _ ... at 5wpm or slower! Anayway I have been experimenting
with spread spectrum ever since I have graduated from college. I
have 4 rf modems that are good at 19.2k baud. they work fine in the
yard. I use the Linux operating system and a modified version of the
AX.25 protocol.   Now I would like to get a amplifier for them and have
been reading up on the FCC rules... man even if I transmit at the legal
4 watts they limit your dB gain on your antennea. So I say, hell, go
for it. Right now I am working on a high speed packet wireless
connection to the net. I have an ISP interested now I need to find a
backer. I'm going to set up a cell stucture and each cell will have one
digipeater. Right now I just have three packet modems spread apart
line of site in a straight line over a mile. (low power). I wish I had
5 of these so I can set up a cell. Anyway they are Proxim Spread
Spectrum modules. I had to design a PC interface ... no bid deal.
Anyway now I'm looking at the WavLAN cards for the next project. I
would like to continue to use AX.25 protocol because 802.2 & 802.3
protocol will not detect data collision since wireless spread spectrum
is half duplex.

38. Re: [SS:401] Re: Some news from the WLAN front...

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 15 Jul 96 11:16:10 UTC
To: ss@tapr.org
Message-ID: <10669@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Jerry,

I think u are overreacting. No country in the world requires a "150 words per mminute on morse code" operator proficientcy. The maximun the U.S. requires is 20 wpm, and u can use many HF frequencies with as little as 5 wpm, and all of the VHF/UHF/Microwave bands without any code proficientcy at all.

Ham Radio is not all bad. We would not have this news group without it.

True, some hams in positions to make technological developement on ham radio misreable, for any one who would dare it, are. Even the FCC has an anti-technological rules base , even tho in the first paragraph of those same rules, it says that the rules are suppose to foster technological development usage of the Ham Radio allocations.

So, its not supprising, that some hams fall on the side of the "spirit" of the law, and others on the "letter" of the law.

BTW, Isn t there a company in San Francisco area that is doing what ur are planning, already?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

39. Re: [SS:400] Re: Some news from the WLAN front...

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 15 Jul 1996 14:48:53 -0400
To: ss@tapr.org
Message-ID: <1EA94750.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Steve,

I agree with most of what you said, however one point needs to be addressed further: the fear that SS will cause widespread interference. Apparently, the ARRL has enough reservation about SS to put restrictions in place. I would like to hear from ANYONE who knows of ANY major SS interference test conducted, past or present. I firmly believe that without this type of data in hand, the hysteria over SS will continue.

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:400] Re: Some news from the WLAN front...
Author: ss@tapr.org at BALT.SMTP
Date: 7/14/96 8:21 AM

Greg Jones wrote:

[book deleted]

> P.S. As a side note to everyone reading this -- are you an ARRL member ?
> Have you sent e-mail or called your ARRL Director and let him/her know you
> are in favor of the league proposal on RM-8737. Do so! They really need to
> hear from some of the people that think that the RM is a good thing, instead
> of what they hear a lot of -- it is EVIL :-) As a mode, SS interested
> amateurs are falling down on petitioning our local leadership within the
> ARRL about the issue we are discussing here. Anyway ....

As I read it, the ARRL membership is voting for standing still. They remind
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to sustain themselves and their PAC issues. The issue that caused

Codeless-2
was the FCC chopped off some spectrum. The deer in the road moved an
inch.
Listening to the ARRL told us that the world was going to end if
Codeless
heathen were allowed licenses. We all bought that and replied Amen.
Then
when the FCC chopped off spectrum, we saw that the ARRL position was
wrong.
That this government agency has the power and will to reallocate
spectrum of
a dying or non-progressive user base, requires that we not make that
mistake
again. If the ARRL blocks SS, or limits it to a narrow segment, I think
it
will turn out to be another Codeless-1 fiasco. There are no sacred
modes in
my book. Those members who vote for standing in the road are just being
selfish (I got my frequency--to hell with everyone else). I predict
that we
will still be using 1.2 kbps 10 years from now, and the ARRL will then
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ready for Spread-Spectrum-2 after the FCC chops off all of UHF and
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I think the rules should read: No station shall transmit on any
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Hopped
Spread Spectrum. This rule shall apply to all Part 97 band segments.
Use
of AM or FM is strictly forbidden (AM includes SSB, DSB, etc). That's
my
position. I think TAPR should produce a protocol paper on how this
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would work. For next years scholorship competition, the candidate will
write
a thesis on the protocol and operating techniques for a spectrum
allocation
in which 90% of the users will operate in FH or DS (the rest supposedly
working CW or jamming).

--
Steve
"Shall we Jump, or move an inch, we will probably be killed in any
case."

40. group purchase of WaveLAN 915 MHz cards

From: buaas@wireless.wdc.net (Robert A. Buaas)
Date: Mon, 15 Jul 1996 15:24:09 -0700
To: ss@tapr.org
Message-ID: <199607152224.PAA13479@wireless.wdc.net>
Rendered body type: text/plain

LAST CALL

If you're interested in purchasing any of these $200 cards,
and you've sent me email and did not just receive an announcement
from me, please email directly to me. I'm away from home and
doing this by remote control. I must commit to quantity and
payment tomorrow morning. Newcomers, email accepted.

best regards/bob K6KGS

41. Re: [SS:402] Re: Some news from the WLAN front...

From: Jerry Normandin <jerryn@ici.net>
Date: Mon, 15 Jul 1996 22:16:58 -0400
To: ss@tapr.org
Message-ID: <31EAFB9A.5F2B8617@ici.net>
Rendered body type: text/plain

wb9mjn@wb9mjn.ampr.org wrote:

>
> BTW, Isn t there a company in San Francisco area that is doing what ur are
> planning, already?
>

> 73, Don.
>
> Mailbox : WB9MJN @ N9HSI.IL.USA.NA
> AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
> Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu
Maybe ... I am on the east coast. NO ONE IS ATTEMPTING A DSS NETWORK HERE! Anyway the contest is on to see who can write the best protocol for wireless. I am using my version of X.25. I use LZW compression on the Data packets and also have added packet types.... such as router table update information. It minimizes the "hops" the data takes. The "Router table" information packet gets transmitted to every station and gets updated on a regular interval. I am very surprised no one has router route table for wireless communications. Everyone ends up digipeating the packet without it. Oney the digipeaters in the path od the route are used. This reduces traffic big time. I am using my modified X.25 protocol because 802.2 and 802.3 can't detect packet collisions since the NECWaveLan cards are half duplex.
Remember... I am not a mega huge company. I am starting this on the experimentation level as a hobbyist. When I went to College I took analog and digital design, programming I picked up on the job. Now I am combining all I learned in college and aon the job to pull this project off. I am using the Linux Operating system in the routers. Now I just need the money to pick up the amplifiers and the additional NECWavelan cards. Have the computers.

Anyway I wish you guys luck. The ARRL doesn't figh enough to save spectrum. Man..... If we all get pissed aoff enough we can make a broad spectrum jammer to show the governemnt what we can do...
Man the commercial frequencies are too expensive...
If we can establish a wireless internet frequency allotment for hobbyists that will be cool.... almost like Packet... the Gnu Generation. The target for us is 2.4Ghz DSS , The NEC WaveLAN Cards I found so far go for about $695.00 , have you found any for less $$$??

42. Re: [SS:404] group purchase of WaveLAN 915 MHz cards

From: Jerry Normandin <jerryn@ici.net>
Date: Mon, 15 Jul 1996 22:21:56 -0400
To: ss@tapr.org
Message-ID: <31EAFCC4.3DA73D72@ici.net>
Rendered body type: text/plain

Robert A. Buaas wrote:
>
> ***LAST CALL***
>
> If you're interested in purchasing any of these $200 cards,
> and you've sent me email and did not just receive an announcement
> from me, please email directly to me. I'm away from home and
> doing this by remote control. I must commit to quantity and
> payment tomorrow morning. Newcomers, email accepted.
>
> best regards/bob K6KGS
I am interested in a pair... need more info!!!!!!!!!!!!
Need model # so I can check if it's compatible with Linux (My OS of Choice)!

43. RE: 386] Re: Some news from the WLAN front...

From: Marcel van de Zande <Marcel.Z@lxe.nl>
Date: Tue, 16 Jul 1996 08:26:18 +0200
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <c=NL%a=_%p=LXE%l=LXENL-960716062618Z-197@lxe.nl>
Rendered body type: text/plain

You could also try to use the PROXIM 2.4Ghz PCMCIA/ISA SS cards. they start at USD700 or so and will have a speed of 1.6Mbps!

>----------
>From: Lee W. Fry[SMTP:lfry@mindspring.com]
>Sent: Tuesday, July 09, 1996 10:27 PM
>To: ss@tapr.org
>Subject: [SS:386] Re: Some news from the WLAN front...
>
>At 10:42 AM 7/3/96 -0500, Glenn Elmore <glenne@hpsadr2.sr.hp.com>
>wrote:
>>
>>I think there is the possibility of something interesting being built out
>of >the commercial networking products that are being developed.
>

>There are interesting products at both the component and board/box
>level.
>
>In December 93, W7SX (Robert Zavrel) gave a presentation to our company
>club
>on the potential application of the Plessy DE6003 2.4GHz SS tranciever
>to an
>amateur digital network at 625 Kbps. At the time he was an engineer at
>Plessey in Scotts Valley. He had done his homework, but apparently
>didn't
>get enough interest to gain momentum. Looked real neat to me. 625Kbps
>would make ISDN look sick. The DE6003 was just sampling at the time,
>and I
>don't know if it really became available.
>
>I know that there is much more out there, for example the 900 MHz
>modules
>that ALFA Inc.
>offers.
>
>In March of 95 someone at Thorne EMI LPRS gave me some information on
>a
>RS-485 serial interface tranciever they have developed operating at
>2.45GHz
>and capable of up to 1Mbps. It conformed to European Standard ETS 300
>328.
>Price was given as 488 UK pounds sterling (ex vat) in quantities 1 -
>10.
>Info can be found at Thorne
>EMI
>
>With gain antennae these types of units could be good for several
>kilometers
>point-to-point. There is a possibility, if you get enough players, of
>putting together a fairly high performance network across a regional
>area.
>
>How about we get together some sort of survey of what's available out
>there
>in the commercial marketplace as chip sets, trancievers, and also
>interesting R&D reports etc. and create a central set of pointers so
>potentially interested people can get some inspiration? If someone
>wants to
>add it to their existing web page that's great, or maybe someone can
>hang
>something up at TAPR, or I'll even volunteer to try to put up something
>on
>my mindspring account.
>
>Any takers?
>
>Lee W. Fry
>lfry@mindspring.com
>AA0JP
>
>
>

44. Re: [SS:406] Re: group purchase of WaveLAN 915 MHz cards

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Tue, 16 Jul 1996 07:25:15 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960716072312.759A-100000@zeus>
Rendered body type: text/plain

> > best regards/bob K6KGS
> I am interested in a pair... need more info!!!!!!!!!!!!
> Need model # so I can check if it's compatible with Linux (My OS of
> Choice)!
>

I am just about to head out the door.. For whoever is interrested in
these Wavelan cards, check out: http://www.wavelan.com. I found this to
be the most descriptive (in terms of specifications).

Bernie

45. Linux / wavelan

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Tue, 16 Jul 1996 07:26:20 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960716072526.759B-100000@zeus>
Rendered body type: text/plain

> I am interested in a pair... need more info!!!!!!!!!!!!
> Need model # so I can check if it's compatible with Linux (My OS of
> Choice)!
>

Forgot to mention.. Late Linux kernels have direct support for Wavelan.

Bernie

46. Atmel SS chips - Any one testing them ?

From: radiobit@bernia.dragonet.es
Date: Tue, 16 Jul 1996 17:05:00 +0200
To: <ss@tapr.org>
Message-ID: <1.5.4.16.19960716164535.2237e1e2@mail.dragonet.es>
Rendered body type: text/plain

Hi All,

I have just being looking at ATMEL www page and found that they are producing some products aparently dedicated to SS applications. Have no idea about how all this SS technology really works so this is just a question to the *gurus* in order to know if this Atmel's chips are of any use for amateurs.

All the products state as *Preliminary* and have no idea about pricing and delivery time (samples ?). You can get the full data sheet info from the www at: http://www.atmel.com
then look for Products/Microcontrollers

They have a very nice *Fax on demand* service I have used (abused). You give your fax number and select up to five products. Then they fax you the requested data sheets. It took nearly one hour to receive the complete data sheets of the selected SS products. Load your fax with a new paper roll !

The SS products are:

AT48801 - 8 bit Spread Spectrum Microcontroller
Apparently this is a *standard* 87C52/16MHz CPU. No idea why they call it SS Microcontroller (?)

AT48802 - Spread Spectrum Signal Processor Integrated Circuit
Reading the data seems like the chip is oriented to SS cordless telephone applications. Interfaces to a 8051 family CPU

AT48810 - 900MHz Spread Spectrum Module
1mW Narrowband Operation, or 1 and 50mW Spread-Spectrum Operation

So what can one do with this (specially AT48802) ?. Can it be an experimenting platform for amateurs or this is just a waste of time/money ?

73s de Luis, EA5DOM

47. Wireless Lan card question

From: Ronen Pinchook <ronen@netmanage.co.il>
Date: Tue, 16 Jul 96 19:47:15 PDT
To: ss@tapr.org
Message-ID: <Chameleon.4.00.6.960716195147.ronen@ronen.netmanage.co.il>
Rendered body type: text/plain

Hello all
I'm new in this group
I saw a forwarded message few days ago talking on a 900 MHZ wireless lan that someone
use ,
My question is as follows , 1)can it be used with JNOS software
and 2) if I want to use this station as a router (i.e pass one network from one place (via radio) to other Place (again via radio)) can it be done with only one card or I need to put two cards ???
Please Advice
Ronen - 4Z4ZQ

48. Amateur SS Outside of NA?

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Fri, 19 Jul 1996 18:59:20 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199607191859.SAA01898@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

I'm interested in finding out whether any forms of spread spectrum
experimentation in the amateur bands are permitted in countries other
than the US and Canada. If so, I'd like to get some details about the
rules and regulations involved, and about any experimental work actually
taking place. I'd also like to hear comments about the prospects for
amateur radio SS in other countries, and about any initiatives taking
place towards obtaining the necessary permission.

Please reply to bm@lynx.ve3jf.ampr.org, and cc the list if you think
your comments may be of general interest. This info is being sought for
a paper I'm working on...

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

49. RE: [SS:412] Amateur SS Outside of NA?

From: "Peleg L. Lapid" <lapid@netvision.net.il>
Date: Sat, 20 Jul 96 23:12:24 PDT
To: ss@tapr.org
Message-ID: <Chameleon.960720232904.lapid@dialup.netvision.net.il>
Rendered body type: text/plain

Hello Barry

The administration in Israel do not see any reason to go into the
way you modulate your signals, as long as you are within the band, do not
cause interference in the band, and the communication is within what is
allowed to Radio Amateurs.

The administration agrees on any kind of experimentation, but eventually
askes the Radio Amateurs to comply with IARU region I Band Plan.

As much as I know we have SS experiments only in the 2300-2450 MHz. band and
it is done by me.

73 Peleg 4X1GP

Name: Peleg L. Lapid
E-mail: lapid@Netvision.net.il
        lapid@tx.technion.ac.il
        4x1gp@4x4ac.ampr.org
Date: 07/20/96
Time: 23:12:24
----

50. SS Comments from AMRAD

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 23 Jul 1996 22:31:36 -0500 (CDT)
To: ss@tapr.org (Spread Spectrum)
Cc: 70323.2750@compuserve.com (Bill Tynan),
        clark@tomcat.gsfc.nasa.gov (Tom Clark)
Message-ID: <199607240331.WAA09605@tapr.org>
Rendered body type: text/plain

The following is an article which appeared in the May-June 1996 issue of the
AMRAD Newsletter. Submitted by: Andre Kesteloot N4ICK

I'll be putting this up on the TAPR SS Web Pages Shortly
http://www.tapr.org/ss

Cheers - Greg

Spread Spectrum Update
by Andre Kesteloot N4ICK

Spread-Spectrum continues to be a source of lively technical discussions at

the AMRAD Taco meetings (every Saturday lunch, see the back of this Newsletter for details) but this time, I would like to reprint portions of written communications by two non-Taco attendees.

On March 11, 1996, Bill Tynan W3XO submitted his comments to the FCC, and you will find below what I consider the most relevant technical passages.

[...] I (writes Bill Tynan) have major reservations concerning the Petition for Rule Making filed by the American Radio Relay League last December. Although I am in favor of developing new technology in the Amateur and Amateur Satellite bands, including Spread Spectrum (SS) techniques, I am concerned that SS's widespread use, with no frequency restrictions, will cause major interference to satellite operation as well as to weak signal terrestrial and EME work. Therefore, I strongly suggest that any relaxation of the spread spectrum rules that the Commission may decide upon, should be accompanied by restrictions limiting it to specific frequency segments within the Amateur and Amateur Satellite bands. Otherwise, it has the potential to make reception of the relatively weak signals from amateur satellites, distant terrestrial stations and signals reflected from the Moon, all but impossible in many parts of the country, particularly in urban areas.

In support of this contention, I cite both calculations made relative to potential SS signal levels and the ARRL's own statements with regard to potential interference which Spread Spectrum might cause. To obtain a measure of the possible interference that could result from only a single spread spectrum station, the following parameters are assumed:

   Spread spectrum station with an effective power of 100 W ERP = +20 dBW
   If spread over 10 MHz (-50 dBW / Hz
   Free-space attenuation at 20 km from the spread spectrum station in the 70 cm
         (420 - 450 MHz) band = -110 dB
   Spread spectrum signal at 20 km = -160 dBW / Hz

   A receiver with a 1 dB NF (common in satellite & weak signal work) = -210 dBW / Hz

This results in the spread spectrum signal causing as much as a 50 dB increase in the noise floor existing without it.

Even if the SS station has a power of only 1 Watt ERP (20 dB less), the noise floor would still be as much as 30 dB higher because of its presence. Similar calculations for other distances can also be done. For example, the spread spectrum signal would be 20 dB stronger at a 2 km distance. As another example, a 100 Watt transmitter and 10 dB gain antenna could create 10 dB more interference. Obviously, if the spread spectrum station is in close proximity to the satellite, terrestrial weak signal or EME, station, the degradation from the spread spectrum station's operation would be much greater.

The effect of automatic power control for SS stations using transmitters over 1 Watt is difficult to assess, but one can envision situations in which interference from other SS stations, as well as non-SS stations, might cause the SS station(s) to increase their power in order to retain the desired signal to noise ratio. In such a case, power control would do nothing to alleviate interference for other users of the band.

It might be said that antenna directivity would provide protection. I believe that, with increases in noise floor as great as these cited above, antenna directivity will not help much. If the increases were in the order of 5 to 10 dB antenna directivity might be of some benefit, but not for the cases noted. The reason for this is that few amateur satellite ground stations, or even terrestrial weak signal operators, have antennas with side lobes down 30 dB. I am not sure that even EME operators have antennas that good. In addition, there are many instances in which antennas being used to receive amateur satellites, or signals reflected from the Moon are pointed, near the horizon rather than being elevated. For example, LEO satellites are typically below 10 degrees elevation approximately half the time during which they are within range of a given location. Of course, antennas for terrestrial work are always pointed at the horizon. In these cases, there is no improvement from using directive antennas if an interfering spread spectrum station happens to be in the same direction as the desired satellite, terrestrial station; or even the Moon.

The received signal strength for EME stations on 70 cm is in the order of -150 dBm, many times even less. Obviously, because of such extremely low received signal strengths, ANY increase in noise floor would be sufficient to render successful EME work impossible.

Therefore, significant use of SS, which might include 432 MHz would probably spell the death knell for EME as a viable mode on that band. [...] I believe that spread spectrum operation should be encouraged. I think that it will eventually prove to be a valuable mode for both terrestrial and satellite applications, and maybe even EME. However, I believe that it should be restricted to certain frequency segments so as to offer minimal interference to other modes, while still allowing experimentation. The Commission has done this in other amateur rules. For example, voice operation is limited to certain segments in the HF and VHF amateur bands. Unattended digital operation is restricted to certain small segments in the HF bands and unattended beacons are limited to specific segments on 10 meters through 70 cm.

To alleviate the kinds of interference cited, I believe that spread spectrum should not be allowed below 450 MHz. I know that the current rules allow it in the 420 - 450 MHz band, It may be argued that this proves that spread spectrum poses no threat to other types of operation, since no reports of interference have been registered in the ten years since it was authorized. However, the ARRL admits in their Petition that SS operation has not been widespread. This is probably an understatement. I am not aware of the results of any SS operation. None were reported to me when I was writing The World Above 50 MHz and no papers on amateur SS experiments have been given at AMSAT's annual Space Symposiums. Specifically, I know of no reports of tests showing the potential interference to other modes of operation including weak signal modes, by SS operation even though SS operation has supposedly been taking place since 1985.

I would like to see spread spectrum develop and become a major factor in Amateur Radio, especially on the microwave bands. But, I do not think it should be allowed to do so to the detriment of other modes of operation. It has not been demonstrated that it won't. In order to allow it to fulfill its potential and still protect these other types of operation, I believe that spread spectrum should be authorized only in certain band segments beginning in the 33 cm (902 - 928 MHz) band. Specifically it should be placed in segments that provide protection for weak signal terrestrial and EME operation which occur in fairly narrow segments at 432, 902, 1296, 2304, 3456, 5760 and 10,368 MHz.

Such an approach will also protect amateur satellite operation in the 435 - 438 MHz band. It might be possible to allow SS in the 1260 - 1270 MHz (uplink only) and 2400 - 2450 MHz satellite bands, but that should be studied prior to doing so. Certainly, SS should be allowed in some satellite bands, as it will probably prove useful for satellite work in the future. Possibly restricting it in the lower 5 or 10 MHz portion of the 2400 - 2450 MHz band, but permitting it in the upper portion, would protect existing, and near-term future, amateur satellite operation and still permit the use of Spread Spectrum with satellites designed for it in the years to come.

- - - - -

I brought the above comments by Bill Tynan to the attention of Alan Eynon N3IRL who, on 13 May 1996, offered the following observations:

Hi Andre,

Thanks for forwarding Bill's comments. I found them well-reasoned and thoughtful, and it is certainly a relief to read a discussion about spectrum allocation that crosses the "this is mine and you can't have it" threshold and actually goes on to concrete proposals about sharing the resource.

I won't argue with Bill's numbers, but I don't believe their application corresponds to how those of us who design spread systems actually intend to use them. In short, I don't think his receiver is going to see us.

Here's why:

I prefer to work backwards from Bill's numbers. Let us assume that I, too, have a receiver with a noise floor of -210 dBW / Hz over a 10 MHz reception bandwidth. Let us assume the main lobe of my spread signal fills the 10 MHz. That is a 5 Mchip/sec signal. So far, this is straight from what Bill said.

I am going to assume that I can get 30 dB processing gain from that 5 Mchip / sec signal, so I'm either operating at 5 kbps BPSK, or 10 kbps QPSK.

I can normally demodulate a BPSK signal and get a decent bit error rate at

an output (de-spread) SNR of 15 dB. This gives me a processing margin of (30-15) = 15 dB

In other words, my signal can be 15 dB below the noise floor of my receiver, and I'll still get enough de-spread SNR for good BER performance. That's a received signal of -225 dBW / Hz.

Assuming the same path loss at 20 km (-110 dB), that means my transmitter power density is -115 dBW / Hz.   The signal is spread over 10 MHz (70 dBHz), so my transmitter EIRP must be -45 dBW, or about 32 (W.

If I have done the math right, that's where I would be operating, at a level that won't even break the noise floor of Bill's receiver. In fact, that 15 dB processing margin equates to a factor of roughly 30 in signal power, and since signal power is inversely related to the square of the distance, his station can be over 5 times closer (no more than 4 km away), and my spread signal still won't interfere with his receiver. Alternately, there could be 30 of us on the same 10 MHz band, all 20 km from Bill, and he won't detect our presence. Even in the Baltimore / Washington area, I can't imagine there will be enough hams doing SS to cause grief.

Rather than allocating discrete portions of spectrum for spread operations, wouldn't it be better to open all bands above HF to SS, but as a secondary user on a not-to-interfere basis? Certainly the FCC could set power levels, spreading rates, and suitably long sequences (to provide adequate spectral content for the signal, viz.: it wouldn't make sense to use a 15 chip spreading sequence at 5 Mchip/sec, since the spread carrier tones would then be 333 KHz apart) to satisfy even the most discriminating EME and weak signal enthusiasts. And this would also give them access to all the bands, instead of (potentially) blocking portions with needlessly powerful SS transmissions.

I encourage further discussion on how both user communities can share the entire spectrum.

Alan N3IRL

51. Re: SS Comments from AMRAD

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 23 Jul 1996 22:58:43 -0500 (CDT)
To: ss@tapr.org (Spread Spectrum)
Message-ID: <199607240358.WAA10530@tapr.org>
Rendered body type: text/plain

Just in case you didn't see it -- the message from Andre had new content at the end :-) Check it out -- Alan Eynon takes a shot at disproving Bill Tynan numbers in his RM-8737 reply comments.

Cheers - Greg

52. WaveLAN 915 MHz cards received

From: Kevin Williams <kevin_williams@eee.org>
Date: Tue, 23 Jul 1996 21:16:17 -0700
To: ss@tapr.org
Message-ID: <199607240418.XAA10993@tapr.org>
Rendered body type: text/plain

To all who ordered the cards through Bob they are on there way.

I received my order today, and now have 2 computers networked using the cards. As a test I transfered 11MB. It took 5 1/2 minutes.

Bob, thank you for taking the time to put together the group purchase.

I am looking forward to hearing more success stories.

73 and good luck
Kevin
--
Kevin Williams KN6UO
Internet - kevin_williams@eee.org
AX25 - KN6UO@KE6TXE.#SOCA.CA.USA.NOAM

53. Re: [SS:414] SS Comments from AMRAD

From: Steve Sampson <ssampson@othello.tinker.af.mil>
Date: Wed, 24 Jan 1996 04:49:18 -0600
To: ss@tapr.org
Message-ID: <31060EAE.1C35@othello.tinker.af.mil>

Rendered body type: text/plain

> [...] I (writes Bill Tynan) have major reservations concerning the
> Petition for Rule Making filed by the American Radio Relay League last
> December. Although I am in favor of developing new technology in the Amateur
> and Amateur Satellite bands, including Spread Spectrum (SS) techniques, I am
> concerned that SS's widespread use, with no frequency restrictions, will
> cause major interference to satellite operation as well as to weak signal
> terrestrial and EME work.

Oh dear. I often wonder how many people really work EME? Probably
about 1%
of the licensee's (is that too large an estimate?). So on that account,
the
other 99% should be relegated to secondary status. While the response
letter
was written well, its major thesis is that "1930's technology should
outweigh
any 1990's technology in spectrum management."

I've been a Republican all my life, so I've never really had the
motivation
that drives people to regulation and law writing which places the
federal over
the local. Do we really want to be "allowed" to do this or that, or do
we
want to have fun? The rules should be written to err on the side of
experimentation. The rules should say "here's the limits of the
spectrum,
here's the international rules we have treaties to abide, but inside
that
space you can do whatever you want."

The anti-thesis of that, is to specify in tiny print and wonderous
volume,
the top down federally mandated rules that allow you to do nothing
really
(what we have now).

Let's be serious. Should the part-97 rules be written to the lead child
level, or should they be written for the local user. If Nebraska has
zero
EME enthusiasts, should it be federally restricted to any mode, just
because
some schmuck in Florida likes that mode? If there are no Satellites in
Alaska,
should the rules prevent using the frequencies for something else
locally?

Steve, N5OWK
"Local over Federal"

54. Re: ARRL reasoning

From: Steve Sampson <ssampson@othello.tinker.af.mil>
Date: Thu, 25 Jan 1996 06:55:15 -0600
To: ss@tapr.org
Message-ID: <31077DB3.36E7@othello.tinker.af.mil>
Rendered body type: text/plain

It's just a guess on my part, but the reason I don't think there'll
be SS on UHF and below, is that the ARRL is trying to become the
national frequency coordinator. If you need a frequency to put up
a repeater, you will go to the ARRL first (non-members need not
apply). Given this role, it would be pretty dumb to shoot yourself
in the foot by allowing SS in these allocations. Best to relegate
that mode to microwave. The .001 percent chance that a Ham operating
SS will trigger the (30's technology) repeater, would produce the
same response as someone using anothers credit card without previous
approval.

Once you know where the ARRL is headed (low technology), you can better
understand the position they are taking. There's big money in being
the national frequency coordinator. Better than that, there's power.

Again, you can see where local coordination is much to be desired over
federal coordination. If you are a PAC and give plenty of money to the
right Congressperson, then the reward is power. But what kind of power
is this? It might have been potent 20 years ago, today being a repeater
frequency coordinator, is like being a policeman who stands in an
intersection and controls traffic. Wouldn't it be better to just

increase technology and automate it? Now I agree you can go to far!
Witness these "intelligent" signals that have ruined our lives. I
remember the days you could drive from 12 Mile Corner to downtown
Portland and never get stopped by a light. They were all synchronized!
Much like spread spectrum. Hey! Synchronicity(sp?)...

Steve, N5OWK
"Socialism is just plain evil" - The Tick

55. Re: [SS:417] Re: SS Comments from AMRAD

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 24 Jul 1996 15:40:26 -0400
To: ss@tapr.org
Message-ID: <1F775380.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Steve,

     I like your style!!

     73s de
     Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:417] Re: SS Comments from AMRAD
Author: ss@tapr.org at BALT.SMTP
Date: 7/24/96 5:14 AM

> [...]   I (writes Bill Tynan) have major reservations concerning the
> Petition for Rule Making filed by the American Radio Relay League last
> December. Although I am in favor of developing new technology in the Amateur
> and Amateur Satellite bands, including Spread Spectrum (SS) techniques, I am
> concerned that SS's widespread use, with no frequency restrictions, will
> cause major interference to satellite operation as well as to weak signal
> terrestrial and EME work.

Oh dear. I often wonder how many people really work EME? Probably
about 1%
of the licensee's (is that too large an estimate?). So on that account,
the
other 99% should be relegated to secondary status. While the response
letter
was written well, its major thesis is that "1930's technology should
outweigh
any 1990's technology in spectrum management."

I've been a Republican all my life, so I've never really had the
motivation
that drives people to regulation and law writing which places the
federal over
the local. Do we really want to be "allowed" to do this or that, or do
we
want to have fun? The rules should be written to err on the side of
experimentation. The rules should say "here's the limits of the
spectrum,
here's the international rules we have treaties to abide, but inside
that
space you can do whatever you want."

The anti-thesis of that, is to specify in tiny print and wonderous
volume,
the top down federally mandated rules that allow you to do nothing
really
(what we have now).

Let's be serious. Should the part-97 rules be written to the lead child
level, or should they be written for the local user. If Nebraska has
zero
EME enthusiasts, should it be federally restricted to any mode, just
because
some schmuck in Florida likes that mode? If there are no Satellites in
Alaska,
should the rules prevent using the frequencies for something else
locally?

Steve, N5OWK
"Local over Federal"

56. Re: [SS:414] SS Comments from AMRAD

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Wed, 24 Jul 1996 15:32:27 -0400
To: ss@tapr.org
Message-ID: <1F775340.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

I still haven't been convinced that SS will become a major form of interference among the amateur community. SS has been used by the military and NASA for years and to the best of my knowledge, no interference has been recorded. Also, how many hams will actually use SS anyway? The only people I hear talk about it are the homebrew types. I think to really put this issue to rest, a major test should be conducted using all possible situations that interference could occur. I would like to do a limited test in my area (Orlando, FL), but first I need to construct a SS transmitter!

73s de Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:414] SS Comments from AMRAD
Author: ss@tapr.org at BALT.SMTP
Date: 7/23/96 10:45 PM

Hi Andre,

Thanks for forwarding Bill's comments. I found them well-reasoned and thoughtful, and it is certainly a relief to read a discussion about spectrum allocation that crosses the "this is mine and you can't have it" threshold and actually goes on to concrete proposals about sharing the resource.

I won't argue with Bill's numbers, but I don't believe their application corresponds to how those of us who design spread systems actually intend to use them. In short, I don't think his receiver is going to see us.

Here's why:

I prefer to work backwards from Bill's numbers. Let us assume that I, too, have a receiver with a noise floor of -210 dBW / Hz over a 10 MHz reception bandwidth. Let us assume the main lobe of my spread signal fills the 10 MHz. That is a 5 Mchip/sec signal. So far, this is straight from what Bill said.

I am going to assume that I can get 30 dB processing gain from that 5 Mchip / sec signal, so I'm either operating at 5 kbps BPSK, or 10 kbps QPSK.

I can normally demodulate a BPSK signal and get a decent bit error rate at an output (de-spread) SNR of 15 dB. This gives me a processing margin of (30-15) = 15 dB

In other words, my signal can be 15 dB below the noise floor of my receiver, and I'll still get enough de-spread SNR for good BER performance. That's a received signal of -225 dBW / Hz.

Assuming the same path loss at 20 km (-110 dB), that means my transmitter power density is -115 dBW / Hz. The signal is spread over 10 MHz (70 dBHz), so my transmitter EIRP must be -45 dBW, or about 32 (W.

If I have done the math right, that's where I would be operating, at a level that won't even break the noise floor of Bill's receiver. In fact, that 15 dB processing margin equates to a factor of roughly 30 in signal power, and since signal power is inversely related to the square of the distance, his station can be over 5 times closer (no more than 4 km away), and my spread signal still won't interfere with his receiver. Alternately, there could be 30 of us on the same 10 MHz band, all 20 km from Bill, and he won't detect our presence. Even in the Baltimore / Washington area, I can't imagine there will be enough hams doing SS to cause grief.

Rather than allocating discrete portions of spectrum for spread operations, wouldn't it be better to open all bands above HF to SS, but as a secondary user on a not-to-interfere basis? Certainly the FCC could set power levels, spreading rates, and suitably long sequences (to provide adequate spectral content for the signal, viz.: it wouldn't make sense to use a 15 chip spreading sequence at 5 Mchip/sec, since the spread carrier tones would then be 333 KHz apart) to satisfy even the most discriminating EME and weak signal enthusiasts. And this would also give them access to all the bands, instead of (potentially) blocking portions with needlessly powerful SS transmissions.

I encourage further discussion on how both user communities can share the
entire spectrum.

Alan N3IRL

57. RE: [SS:414] SS Comments from AMRAD

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 25 Jul 96 08:08:48 UTC
To: ss@tapr.org
Message-ID: <10725@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi,

 At quick reading, i find flaws in both the W3XO and N4ICK(AMRAD) comments.

 First, W3XO puts the SS transmitter at 20 km away. Then the AMRAD comments
take advantage of this.

 The SS transmitter could be next door. But, lets make it 1 KM away , for
arguements sake. The closest Ham qth to my QTH is about 1 KM from here.

 Next, the 110 db path loss was used by W3XO to increase the apparent SS
noise floor, and by the AMRAD guys to reduce it. Hi. Hi. Hi.:-). So, there
is apparently something wrong with that 110 dB path loss for 20 km.

 The problem with it is that there is no Fresnel Loss. This is free space loss.
In terrestrial application, on 440, we need to add about 20 dB to this figure.

 A proper way to judge this problem would be to have the SS transmitter 1 km
away from the Satellite/EME station, and for the path loss to the intended
DSSS receiption station at 20 km (12.8 miles) be 130 dB.

 And advantage of Microwaves, is that its much easier to get Fresnel clearance
paths. In which instead of a 20 dB Fresnel loss, the path has a 6 dB Fresnel
gain! Or a difference of 26 dB (factor of 40) in required power/signal band-
width!!!!

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

58. Re: [SS:418] Re: ARRL reasoning

From: ATVQ@aol.com
Date: Thu, 25 Jul 1996 10:47:50 -0400
To: ss@tapr.org
Message-ID: <960725104749_245418952@emout07.mail.aol.com>
Rendered body type: text/plain

ARRL has had more secret meetings with NBFM coordinators...lots of luck
folks...time to take up internet surfing ont he twisted pair.

59. RE: SS Comments from AMRAD

From: Jeff King <jeff@mich.com>
Date: Thu, 25 Jul 1996 21:39:05 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960726013905.0070a4b8@mich.com>
Rendered body type: text/plain

At 09:24 AM 7/25/96 -0500, Don wrote:
>
> Hi,
>
> At quick reading, i find flaws in both the W3XO and N4ICK(AMRAD) comments.
>
> First, W3XO puts the SS transmitter at 20 km away. Then the AMRAD comments
>take advantage of this.
>
SNIP
>
> The problem with it is that there is no Fresnel Loss. This is free space loss.
>In terrestrial application, on 440, we need to add about 20 dB to this figure.
>

The other flaw, at least for EME and Satellite stations, is they are assuming
a line of site path. How many (sane) amateurs put a EME or OSCAR array on
top of a 100 foot tower? It offers no advantage in this application, just raises
the EME/Sat ops noise floor (non SS noise that is).

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

60. Re: [SS:422] Re: ARRL reasoning

From: Jeff King <jeff@mich.com>
Date: Thu, 25 Jul 1996 21:41:30 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960726014130.00709adc@mich.com>
Rendered body type: text/plain

At 10:03 AM 7/25/96 -0500, ATVQ@aol.com wrote:
>ARRL has had more secret meetings with NBFM coordinators...lots of luck
>folks...time to take up internet surfing ont he twisted pair.
>

First, take some time to write your congressman. Most of them have
E-mail addresses. Look on http://www.house.gov

I don't disagree with your opinion, I do disagree (at this point)
with your conclusion.

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

61. Re: [HFSIG:1385] This is more SS related

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 26 Jul 96 11:27:17 +0100
To: ss@tapr.org
Message-ID: <H0000292021f4382@MHS>
Rendered body type: text/plain

I wrote:

> I'm actually in favour of SS, but only where appropriate, ie above
> 2GHz, in exclusive SS bands maybe 10 to 100MHz wide, in a celular
> style high speed random access HAM-LAN digital network. I think you
> would find a lot of support for this, inspiring enthusiastic
> developemnt, but on HF you'll always be swimming against the current,
> fighting a loosing battle, where either you or ham radio in general
> must loose.

Tony wrote:

> The only arguement I can find valid for having SS in the upper bands
> (UHF+) is for a wider spread bandwidth. I STILL haven't heard a valid
> arguement AGAINST SS only that so many people think that SS will
> "raise the noise floor." If every ham will use SS, maybe, but I
> contend this will never happen. I estimate the number of hams using
> this modulation scheme might grow to possibly 10%. And that's being
> liberal with the figures.

Its the near-far problem. The problem of what happens when they guy down
the road trys to work someone at a distance much greater than the
seperation between him and you. The local interference swamps the DX
wipes out all the advantages of processing gain, since it must all be
used to overcome your neighbours transmission.

However there are solutions.

A celular network structure works very well, and is ideal for a HAM-LAN
network. In this case nobody listens on the transmit band except the hub
stations. The hubs control the power of the connected stations and thus
cures the near-far problem. Nobody communicates further than the nearest
hub, and allows the hub to act as a repeater to enable long distance
contacts. You only listen to the nearest hub so near-far is not a
problem in that direction either.

Massive processing gain will help and several ways. This is why you need

enormous bandwidths. 10-100MHz is really needed, giving around 40 dB of processing gain. This allows you to use more power without upsetting your SS/narrow band neighours. 1mW at 1km would be acceptable, and useable provided there are no higher power narrow band users. A 1 watt narrow band station (or ss station) would kill your contact. An exclusive SS allocation is essential.

Directional antennas and well controlled propagation are nessesary, only going to the intended station, no further and no wider. Hence the need for the high gain antennas of the microwave bands. Directional antennas would probably be mandatory for simplex contacts. The TX should use the TX band in a celular system and the RX must null local interference from local celular TXs with high gain antennas. The simplex TX should be a good distance from the local hub or use a directional antenna and or hub controlled power to ensure the hub does not get too much interference. This makes the simplex operators the only people to suffer interference and gives them the ability to overcome it. CQ's could go through the network.

This is what I believe is nessesary for SS to work (on a large scale) in an amateur enviroment, and this is only possible above 2GHz.

Of course a few experimental SS stations on lower bands, taking great care not to cause interference, would be acceptable, but you would have to be very carefull not to use DX frequencies (to the extend of notching your output). Repeater input frequencies are probably a good bet (nobody listens to DX on repeater inputs! - except repeaters which are miles away), just notch the frequency of the local repeater if there is a chance there might be interference. Thats easy to monitor. A notch on the RX side will also be usefull to oviod problems with local 1 Watt repeater users interfering with your RX.

> Lets encourage SS experimentation, and IF
> interference occurs, THEN lets do something about it. Only until we
> have conclusive interference tests will this issue be put to rest.

I agree, although there are simple things we can do now to prevent SS getting a bad name. We dont want to prove the opponents 'right' (in their eyes) through by not taking simple precautions.

Best of luck with your experimentation.

Rob, G0VTQ

62. Part 15 Devices Web Page

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Fri, 26 Jul 1996 10:51:04 -0400
To: ss@tapr.org
Cc: rw@txcc.net
Message-ID: <2.2.32.19960726145104.0070a340@mindspring.com>
Rendered body type: text/plain

Earlier in [SS:386] Re: Some news from the WLAN front... I wrote:

>How about we get together some sort of survey of what's available out there
>in the commercial marketplace as chip sets, trancievers, and also
>interesting R&D reports etc. and create a central set of pointers so
>potentially interested people can get some inspiration? If someone wants to
>add it to their existing web page that's great, or maybe someone can hang
>something up at TAPR, or I'll even volunteer to try to put up something on
>my mindspring account.

So here's a start. Its at http://www.mindspring.com/~lfry/part15.htm   I wanted to get this up to see if there is any interest. I'll be adding more over the next few days and weeks as I get caught up with all my various notes and chase down all the references I can find. My intent is to be only a jump away from "real" information, rather than just being pointed to the top of some site where you can only start to search.

If you have any inputs, corrections, or comments e-mail them.

Enjoy.

Lee W. Fry
AA0JP
lfry@mindspring.com

63. Re: [SS:423] RE: SS Comments from AMRAD

From: Steve Dove <dsp@nbn.net>
Date: Fri, 26 Jul 1996 11:06:27 -0400
To: ss@tapr.org
Message-ID: <199607261506.LAA12635@users.nbn.net>
Rendered body type: text/plain

>
>The other flaw, at least for EME and Satellite stations, is they are assuming
>a line of site path. How many (sane) amateurs put a EME or OSCAR array on
>top of a 100 foot tower? It offers no advantage in this application, just
raises
>the EME/Sat ops noise floor (non SS noise that is).
>

Hi Jeff,
        Not really true. I have to, just to clear 80/90 foot trees and am simply creative about where the amps/preamps live. There are plenty of others who do similar even though none of us really want to, sanity or otherwise notwithstanding; I'd rather have my 3 ele 40m beam back up there, thank you. The horizon (or close to it) is where the better dx possibilities lie and, as I believe someone has previously mentioned, is where satellites (leo or Molniya) spend most of their visibility.

Similarly, many big-time EME'ers have big towers to gain better horizons; their more interesting opportunities occur there, too.

Obviously these horizon conditions equate to a terrestrial line-of-path to somewhere.

Like many I have a foot in both the weak-signal and SS camps and am getting a bit fed up of being made out to be the fount of all evil; either a reactionary Luddite or inconsiderate propellor-head, and on occasion both.

Anecdotal, inferred from the military, third hand and paper proofs on estimations of compatibility or otherwise simply don't cut it; until hard data are available from tests performed to the satisfaction of all interested parties, the divisiveness will grow and fester, the polarisation become total. There is the looming danger that the SS community could do a grand job of completely alienating the elements of the hambone community - the kindred tinkerers / envelope-pushers / doers / thinkers - that should be among their greatest supporters, all without even turning a SS radio on!

Probably the most constructive thing that should be under discussion here presently is the definition of the scope and parameters and logistics of such a test or tests.

        73   Steve   NM2Y / G3YDV

64. Comments on SS

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 26 Jul 1996 13:32:33 -0400
To: ss@tapr.org
Message-ID: <1F9026F0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

>Like many I have a foot in both the weak-signal and SS camps and am
>getting a bit fed up of being made out to be the fount of all evil; either
>a reactionary Luddite or inconsiderate propellor-head, and on occasion
>both.

     I'm about fed up with the raising the noise floor crap. Unless we have
     a massive pileup of SS users, this can never happen. And I don't hear
     that many hams discussing SS.

>Anecdotal, inferred from the military, third hand and paper proofs on
>estimations of compatibility or otherwise simply don't cut it; until hard
>data are available from tests performed to the satisfaction of all
>interested parties, the divisiveness will grow and fester, the polarisation
>become total. There is the looming danger that the SS community could do a
>grand job of completely alienating the elements of the hambone community -
>the kindred tinkerers / envelope-pushers / doers / thinkers - that should
>be among their greatest supporters, all without even turning a SS radio on!

     I agree: the best way to put this issue to rest is to conduct a
     massive series of tests, in all frequency bands, in all possible
     (practical) situations. What do I mean by practical? Well,
     transmitting SS near a repeater for one thing. The distance wouldn't
     have to be no more than a few hundred feet (or less if you really want
     to be sure). Next, transmitt near an EME station, during a DX pileup,

etc. Again, the same distance can be used.

All that would be required is a simple SS transmitter transmitting a simple test pattern (CQ CQ CQ de KE4ATO ...). Of course, we need a spectrum analysizer for this to look at the different signals on the bands and have cooperation from a large group of hams in different areas of the country. I can't think of anything else we can do.

73s de
Tony, KE4ATO

65. [SS:419] Re: SS Comments from AMRAD

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 26 Jul 96 18:45:12 +0100
To: ss@tapr.org
Message-ID: <H0000292022014ab@MHS>
Rendered body type: text/plain

Steve writes:

> Oh dear. I often wonder how many people really work EME? Probably
> about 1% of the licensee's (is that too large an estimate?). So on
> that account, the other 99% should be relegated to secondary status.

Tony writes:

>   Steve,
>
>   I like your style!!

Dangerous teritory here. 90% of 2m/70cm users use FM repeaters. Does that mean the majority should rule, and the band should be filled with repeaters, and no-one else should be alowed to do anything more exciting than chatter on handhelds? How many people work SS, what was that about secondary status?

This is amateur radio, not a lynch mod. You have as much right to work EME as anyone else. Would you give that right up? We must find a cooperative solution, not just cast aside anyone that doesn't agree with us.

Rob

66. Guidlines for SS experimentation

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 26 Jul 96 20:10:49 +0100
To: ss@tapr.org
Message-ID: <H0000292022014b6@MHS>
Rendered body type: text/plain

There is quite understandibly a considerable amount of skepticism within the amateur community regarding the effects of spread spectrum in the amateur service.

Most of this is a fear of the *potential* of SS to cause massive interference to amateurs within a mile or two of a spread spectrum transmitter, and the *potential* for intereference at a distance to weak signal modes.

The longer these fears are left unchecked the more this concern will escalate into outright rejection of SS on a wide scale before SS techniques have even had a change to develop into a form compatible with existing users.

Therefore we must act NOW to prepare guidelines for SS experimentation that will address the concerns of the amateur community in general, assuring them that SS experimentation will not cause them interference.

That will mean starting off on a small scale, well away from any areas of contention. Much can be achieved with even modest experimentation, not least of which will be the developemnt of techniques that will allow the amateur community in general to feel more comfortable about SS operation and that the potential for interference is reduced to an acceptable level (acceptable to even EME folks). With this milestone passed SS can expand further with the approval of the general amateur community.

There is little doubt that if everybody runs 100W into a colinear in

suberbia, and spreads over the entire 70cm band, then there will be serious interference. This is what people are afraid of (in the extreem case).

Guidelines are the best way to satisfy people that their operations will not be interfered with, and thus defuse something that is already begining to get out of hand, and let folks carry on experimenting with SS.

Only when techniques are proven and interference potential is well and truely delt with can we expand beyond what should be quite restrictive experimental guidelines.

Here's a few ideas on what these guidlines should look like, but I'm no expert, and others may have other concerns so lets develop these into something that would really work.

SUGGESTED GUIDLINES

Experimental SS operation must be on a strict non-interference basis. Any reported interference must be quickly delt with. Solutions may include immediatly switching the apperatus off, using notch filters for specific frequencies, reducing power, and using directional antennas.

Experimental SS station must accept interference from other non-SS users sharing the same spectrum. (the SS experimentor should devise techniques to reduce the effect of high power, eg 1 watt, narrow band stations on their receiver. This may include increasing the processing gain, or using filtering techniques).

Experimentation should be only on bands above 450MHz. (yes it could be done on lower bands without interference, but we need to reassure folks that there will be no interference, so the best bet is to stay well away.)

SS transmitters must provide filters on their outputs (or TX IF) to ensure no energy is transmitted that may cause interference on the weak signal portions of any band.

Power should be the minimum required for communication.

The receive antenna and receiver should be of good sensitivity. eg a colinear, a high vertical, or a beam, and better than 10dB noise figure in the RX. (this enures minimum required power really is the minimum required power)

Transmit power spectral density should be under 0.1mW per MHz (allowing 1mW over a 10MHz band)

Processing gain should be at least 30dB. (ie 1000:1 spreading factor) (again ensuring minimum TX power, and also reducing the effect of other users on the SS receiver)

Total spread should be less than 10MHz on bands above 2GHz and less than 1MHz on lower bands. (wide spreading will allow a lower PSD, so its a trade off between bandwith *potentially* suseptible to interference and the potential for interference.)

Power outside the spreading bandwidth must be filtered out with filters on or before the output of the transmitter.

SS stations should operate on frequencies that are likely to be clear of any other stations in the local area. (this is to prevent much higher power non-SS station nearby causing interference to the SS receiver which may require the SS transmitter to increase his power to compensate - a 1 watt station at the same distance as a 1mW SS station in the same band will require 30dB processing gain to get even a SNR of 0dB, and 40dB will be needed to make contact.)

Experimental spread spectrum stations should adhere to the following band plan:

32cm: ???-???
23cm: ???-???
12cm: ???-??? etc (these may include more than one 1 or 10MHz segment)

These guidelines are obviously restrictive, and will involve considerably more effort to be put into reducing interference potential, but this is essential if SS experimentation is to be accepted and if SS is to be proven in the amateur enviroment in the longer term.

The argument that it works in other services is not sufficent to alay fears about the use of SS. Amateur radio has many unique charactistics that *may* invalidate this argument, we don't know untill we try.

The above numbers are back-of-the-envelope figures that I think a SS experimenter can work with, and at the same time will satisfy concerns about the interference potential of SS operation in their area on their favorite mode. If you have better ones lets hear them.

This is a gently-gently approach to give SS experimenters the chance to prove the techniques, and is probably way over the top in terms of what is actually nessesary, but its a good start we can work with for now.

Once techniques are developed and proven to the amateur community in general then these guidelines could be relaxed to allow SS to fulfil its rightful place as a mature no-interference or considerate band sharing mode offering great opertunities to amateur radio in general.

Cheers,

Rob

67. [SS:428] Comments on SS

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 26 Jul 96 20:26:30 +0100
To: LANIER.R.A-@smtpgty.bwi.wec.com, ss@tapr.org
Message-ID: <H0000292022020087@MHS>
Rendered body type: text/plain

Tony wrote:

> I agree: the best way to put this issue to rest is to conduct a
> massive series of tests, in all frequency bands, in all possible
[snip]
> All that would be required is a simple SS transmitter
> transmitting a simple test pattern (CQ CQ CQ de KE4ATO ...). Of
> course, we need a spectrum analysizer for this to look at the
> different signals on the bands and have cooperation from a large
> group of hams in different areas of the country. I can't think of
> anything else we can do.

I believe there is another way Tony. (Read my suggested guidelines for SS experimentation). If we can convince people of the *much easier* task that a *very limited* type of SS operation will not hurt them, then we will encourage many operator to take up the mode, relax peoples fear of the worst and let them see what real spread spectrum is capable of. It also gives us a chance to work out the best techniques to oviod any potential problems and delelop this technology to maturity.

Something this controvercial must be done very carefully, takeing every precaution not to interfere with anybody. Blazing guns will never further this cause.

It's unrealistic to actually do as you suggest as a small band of hard core 'extreemists' as some might see us. Many hands make light work!

Cheers,

Rob

68. Re: [SS:424] Re: ARRL reasoning

From: ATVQ@aol.com
Date: Fri, 26 Jul 1996 16:13:35 -0400
To: ss@tapr.org
Message-ID: <960726161335_442757554@emout16.mail.aol.com>
Rendered body type: text/plain

the conclusion was sarcasm, not factual.

69. Re: [SS:423] RE: SS Comments from AMRAD

From: ATVQ@aol.com
Date: Fri, 26 Jul 1996 16:12:49 -0400
To: ss@tapr.org

Message-ID: <960726161249_442757567@emout17.mail.aol.com>
Rendered body type: text/plain

my eme/oscar array consists of 4 33' boom 2 meter M2 antennas, plus 8 on 432
plus 4 on 1296, and a few assorted single yagis on a complete az/el mount at
the top of my 80 foot tower. So I'm one! (most of the time it is for
terrestrial DX with full legal power output amplifiers at the other end of
the 1 5/8" nitrogen filled heliax.
73 Henry KB9FO
A megawatt is just enough!

70. Re: [SS:419] Re: SS Comments from AMRAD

From: ATVQ@aol.com
Date: Fri, 26 Jul 1996 16:12:29 -0400
To: ss@tapr.org
Message-ID: <960726161228_442757499@emout10.mail.aol.com>
Rendered body type: text/plain

there are about 70 EME users inthe world.

71. Re: [SS:428] Comments on SS

From: ATVQ@aol.com
Date: Fri, 26 Jul 1996 16:12:39 -0400
To: ss@tapr.org
Message-ID: <960726161238_442757643@emout10.mail.aol.com>
Rendered body type: text/plain

SS looks like ignition interference on video mode, and there is an increase
in noise floor, I can see it on the S meter of my Yaesu 736. looks like power
line arc QRM 73 Henry

72. Re: [SS:435] Re: Comments on SS

From: Greg Jones <wd5ivd@tapr.org>
Date: Fri, 26 Jul 1996 16:12:29 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607262112.QAA06028@tapr.org>
Rendered body type: text/plain

Maybe you can clarify this -- "I can see it on the S meter of my Yaesu 736"

Maybe you can explain in detail what you are hearing (or think you are
hearing) and what SS it is ? Who is operating SS in your area that would be
causing this ?

Greg, WD5IVD

>
> SS looks like ignition interference on video mode, and there is an increase
> in noise floor, I can see it on the S meter of my Yaesu 736. looks like power
> line arc QRM 73 Henry
>
>

73. Re: [SS:418] Re: ARRL reasoning

From: Gerald J Creager <gerry@cs.tamu.edu>
Date: Fri, 26 Jul 1996 17:41:36 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607262241.RAA13217@solar.cs.tamu.edu>
Rendered body type: text/plain

Steve Sampson sez:
>
> It's just a guess on my part, but the reason I don't think there'll
> be SS on UHF and below, is that the ARRL is trying to become the
> national frequency coordinator. If you need a frequency to put up
> a repeater, you will go to the ARRL first (non-members need not
> apply). Given this role, it would be pretty dumb to shoot yourself
> in the foot by allowing SS in these allocations. Best to relegate
> that mode to microwave. The .001 percent chance that a Ham operating
> SS will trigger the (30's technology) repeater, would produce the
> same response as someone using anothers credit card without previous
> approval.

Not quite true. Interesting, but not quite true.

The NBFM coordinators, along with some few others involved in coordination and
spectrum management, have formed a new group. the Memorandum of Understanding
with ARRL is not complete: ARRL has not signed it. One of the paramoount
things about the MOU is that it does not allow ARRL to dictate anything about

coordiation.

The technology issue may be in doubt, but I tend to share your feelings here.

> Once you know where the ARRL is headed (low technology), you can better
> understand the position they are taking. There's big money in being
> the national frequency coordinator. Better than that, there's power.

Ahem. Guess again.

> Again, you can see where local coordination is much to be desired over
> federal coordination. If you are a PAC and give plenty of money to the
> right Congressperson, then the reward is power. But what kind of power
> is this? It might have been potent 20 years ago, today being a repeater
> frequency coordinator, is like being a policeman who stands in an
> intersection and controls traffic. Wouldn't it be better to just
> increase technology and automate it? Now I agree you can go to far!
> Witness these "intelligent" signals that have ruined our lives. I
> remember the days you could drive from 12 Mile Corner to downtown
> Portland and never get stopped by a light. They were all synchronized!
> Much like spread spectrum. Hey! Synchronicity(sp?)...

Coordination will remain at the local level. NFCC will be a single point of
contact for the FCC, and as such, will determine a mechanism, common for all,
to be recognized as a coordinator in a given area. And a mechanism to
decertify a non-responsive coordinator.

the issue of SS vs. coordination has no place here, despite Henry's attempts
to inject something into this discussion.

gerry n5jxs
n5jxs@tamu.edu

74. Re: [SS:427] RE: SS Comments from AMRAD

From: Jeff King <jeff@mich.com>
Date: Fri, 26 Jul 1996 20:10:54 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960727001054.00704374@mich.com>
Rendered body type: text/plain

At 10:15 AM 7/26/96 -0500, Steve NM2Y wrote:
>>
>>The other flaw, at least for EME and Satellite stations, is they are assuming
>>a line of site path. How many (sane) amateurs put a EME or OSCAR array on
>>top of a 100 foot tower? It offers no advantage in this application, just
>raises
>>the EME/Sat ops noise floor (non SS noise that is).
>>
>
>Hi Jeff,
>   Not really true. I have to, just to clear 80/90 foot trees and am
>simply creative about where the amps/preamps live.

OK, point well taken. My thoughts were to C band earth station installations,
for clark belt satellites.

>   73   Steve   NM2Y / G3YDV
>
>
>
>Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

75. Re: [SS:429] Re: SS Comments from AMRAD

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 29 Jul 1996 08:44:28 -0400
To: ss@tapr.org
Message-ID: <1FCBFD10.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

>Dangerous teritory here. 90% of 2m/70cm users use FM repeaters. Does
>that mean the majority should rule, and the band should be filled with
>repeaters, and no-one else should be alowed to do anything more
>exciting than chatter on handhelds? How many people work SS, what was
>that about secondary status?

My comment about 'how many people will work SS' was intended to show that, in my opinion, SS will not become a major form of interference because not many hams will use SS. I also do not believe SS will raise the noise floor of a communication receiver.

>This is amateur radio, not a lynch mod. You have as much right to work
>EME as anyone else. Would you give that right up? We must find a
>cooperative solution, not just cast aside anyone that doesn't agree with
>us.

I'm not forming a lynch mob, Rob. I don't intend to cast anyone aside. I do feel that others in the amateur community want SS cast aside (1GHz+) because they feel that SS will become a major source of interference. I haven't been involved in ham radio since "the early days," but I do know that some people reguard certain bands as 'their own' and the anamosity towards SS could be steming from this.

>Rob

73s de
Tony, KE4ATO

76. Comments on SS

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 29 Jul 1996 09:19:50 -0400
To: ss@tapr.org
Message-ID: <1FCC0410.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Rob,

I don't think conducting 4 or 5 tests is unrealistic. I guess massive was too strong a word. All I am suggesting is build the transmitter and turn it on. The transmitter will automatically transmit the sequence, so no operator is needed. Next you would need to find a few hams who are up to the task (I'm sure you can find some at a local radio club). Getting the spectrum analyzer is the tricky part, though. I do have some plans for building one for the PC, although I have never used them.

In my opinion, hard facts will beat out ignorance any day. I feel this is the best way to relax people's fear.

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:428] Comments on SS
Author: <Robert.Glassey@nmp.nokia.com> at BALT.SMTP
Date: 7/26/96 8:26 PM

Tony wrote:

> I agree: the best way to put this issue to rest is to conduct a
> massive series of tests, in all frequency bands, in all possible
[snip]
> All that would be required is a simple SS transmitter
> transmitting a simple test pattern (CQ CQ CQ de KE4ATO ...). Of
> course, we need a spectrum analysizer for this to look at the
> different signals on the bands and have cooperation from a large
> group of hams in different areas of the country. I can't think of
> anything else we can do.

I believe there is another way Tony. (Read my suggested guidelines for SS experimentation). If we can convince people of the *much easier* task that a *very limited* type of SS operation will not hurt them, then we will encourage many operator to take up the mode, relax peoples fear of the worst and let them see what real spread spectrum is capable of. It also gives us a chance to work out the best techniques to oviod any potential problems and delelop this technology to maturity.

Something this controvercial must be done very carefully, takeing every precaution not to interfere with anybody. Blazing guns will never further this cause.

It's unrealistic to actually do as you suggest as a small band of hard

core 'extreemists' as some might see us. Many hands make light work!

Cheers,

Rob

77. Re: [SS:397] Re: Some news from the WLAN front...

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Mon, 29 Jul 1996 08:22:09 -0800 (PDT)
To: ss@tapr.org (Greg Jones)
Message-ID: <199607291522.AA217083729@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Greg wrote:
>
> Are you sitting down with a cool one -- get ready, this is a long one :-)
>

<long message deleted>

Greg,

  Thanks for taking the time to put all that down. You're right, it is long and there are multiple topics. I've completed my third reading of it and I'm still not quite sure where to continue from. I think we need to get more bandwidth over which to discuss this. I'm signed up and have airline tickets for DCC in September, see you there!

Glenn n6gn

78. Re: [SS:432] Re: ARRL reasoning

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 29 Jul 1996 11:22:53 -0400
To: ss@tapr.org
Message-ID: <1FCD90D0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

If you are going to comment on something posted to this list, please include the portion of the message you are responding to. We have no idea what your comment is related to.

Thanks,

Tony KE4ATO

_____ Reply Separator _____
Subject: [SS:432] Re: ARRL reasoning
Author: ss@tapr.org at BALT.SMTP
Date: 7/26/96 3:13 PM

the conclusion was sarcasm, not factual.

79. Re: [SS:440] Comments on SS

From: ATVQ@aol.com
Date: Mon, 29 Jul 1996 11:33:15 -0400
To: ss@tapr.org
Message-ID: <960729113313_372229084@emout15.mail.aol.com>
Rendered body type: text/plain

you need an analyzer with a storage scope otherwise you have the porlbem of intercept...the analyzer isnt looking where you are transmitting because of its frequency sweep. Science Workshop has the working of a spectrum analyzer for about $200 inkit form. It works nicely with any scope, and if you have a storage scope, your in like flint. I use an HP 8500 series SA. (yig oscillator)
73 Henry KB9FO

80. Re: [SS:439] Re: SS Comments from AMRAD

From: ATVQ@aol.com
Date: Mon, 29 Jul 1996 11:33:44 -0400
To: ss@tapr.org
Message-ID: <960729113342_372229077@emout12.mail.aol.com>
Rendered body type: text/plain

SS will become popular when the major manufacturers include it intheir
equipment. That is the place to start. And not as an add on accessory.
 Kantronics and other Packet companies should offer the stuff too.   73
 Henry KB9FO

81. Re: [SS:440] Comments on SS

From: Greg Jones <wd5ivd@tapr.org>
Date: Mon, 29 Jul 1996 14:13:24 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199607291913.OAA13868@tapr.org>
Rendered body type: text/plain

On the issue of testing. Robert Buass and his STA has done considerable
testing over the last several years.

Maybe Robert can discuss what has been done and post some of his results
from the tests. That was one reason for the STA.

Robert is on the list.

Anyway -- while the amateur community might not have done extensive testing,
industry sure is and has. The folks that want 2/440 already have
experimental licenses on those bands to show that SS can be done on our
bands as secondary users in order to get into our spectrum. Dewayne can
comment more on this issue.

As amateurs we can nick-pick at either other over the mode or start getting
equipment fielded so that we can start to develop methods our self. As
amateur radio operators we must start to develop modes that will not
interfere with other users (including ourselfs) and be interference
resistance to others that will eventually be allowed access to our bands.
Maybe not this year, or next year, but within the next 5-10 years -- yes.

Cheers - Greg

>
>   Rob,
>
>   I don't think conducting 4 or 5 tests is unrealistic. I guess massive
>   was too strong a word. All I am suggesting is build the transmitter and
>   turn it on. The transmitter will automatically transmit the sequence,
>   so no operator is needed. Next you would need to find a few hams who
>   are up to the task (I'm sure you can find some at a local radio club).
>   Getting the spectrum analyzer is the tricky part, though. I do have
>   some plans for building one for the PC, although I have never used
>   them.
>
>   In my opinion, hard facts will beat out ignorance any day. I feel this
>   is the best way to relax people's fear.
>
>   73s de
>   Tony, KE4ATO
>
>
> _________________________ Reply Separator _____________________________
> Subject: [SS:428] Comments on SS
> Author: <Robert.Glassey@nmp.nokia.com> at BALT.SMTP
> Date: 7/26/96 8:26 PM
>
>
> Tony wrote:
>
> > >   I agree: the best way to put this issue to rest is to conduct a
> > >   massive series of tests, in all frequency bands, in all possible
> [snip]
> > >   All that would be required is a simple SS transmitter
> > >   transmitting a simple test pattern (CQ CQ CQ de KE4ATO ...). Of
> > >   course, we need a spectrum analysizer for this to look at the
> > >   different signals on the bands and have cooperation from a large
> > >   group of hams in different areas of the country. I can't think of
> > >   anything else we can do.
>
> I believe there is another way Tony. (Read my suggested guidelines for
> SS experimentation). If we can convince people of the *much easier* task
> that a *very limited* type of SS operation will not hurt them, then we
> will encourage many operator to take up the mode, relax peoples fear of
> the worst and let them see what real spread spectrum is capable of. It
> also gives us a chance to work out the best techniques to oviod any
> potential problems and delelop this technology to maturity.

>
> Something this controvercial must be done very carefully, takeing every
> precaution not to interfere with anybody. Blazing guns will never
> further this cause.
>
> It's unrealistic to actually do as you suggest as a small band of hard
> core 'extreemists' as some might see us. Many hands make light work!
>
> Cheers,
>
> Rob
>
>

82. Re: [SS:442] Re: ARRL reasoning

From: ATVQ@aol.com
Date: Mon, 29 Jul 1996 20:33:56 -0400
To: ss@tapr.org
Message-ID: <960729203331_444909396@emout17.mail.aol.com>
Rendered body type: text/plain

i guess you dont follow the conversation thread well.

83. RE: 443] Re: Comments on SS

From: Ralph Ward <rw@txcc.net>
Date: Mon, 29 Jul 1996 19:40:04 -0500
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BB7D86.8938A0A0@quercus1>
Rendered body type: text/plain

where do I find science workshop?
Ralph Ward
rw@txcc.net

From: ATVQ@aol.com[SMTP:ATVQ@aol.com]
Sent: Monday, July 29, 1996 5:56 AM
To: ss@tapr.org
Subject: [SS:443] Re: Comments on SS

you need an analyzer with a storage scope otherwise you have the porlbem of intercept...the analyzer isnt looking where you are transmitting because of its frequency sweep. Science Workshop has the working of a spectrum analyzer for about $200 inkit form. It works nicely with any scope, and if you have a storage scope, your in like flint. I use an HP 8500 series SA. (yig oscillator)
73 Henry KB9FO

84. Re: [SS:447] RE: 443] Re: Comments on SS

From: ATVQ@aol.com
Date: Tue, 30 Jul 1996 10:36:57 -0400
To: ss@tapr.org
Message-ID: <960730103652_588199970@emout18.mail.aol.com>
Rendered body type: text/plain

science workshop: 55 wilson lane, bethpage ny 11714.

85. re:[SS:446] Re: ARRL reasoning

From: "gabe (g.) nemeth" <gabe@nortel.ca>
Date: Tue, 30 Jul 1996 11:28:00 -0400
To: ss@tapr.org
Message-ID: <"11543 Tue Jul 30 11:40:05 1996"@bnr.ca>
Rendered body type: text/plain

A very good point. How can I get information on this thread?
Once a Thread has lapsed how do newcomers get the information
that seems to already be a part of the sub-culture?

'73
Gabe Nemeth

86. Interference Testing (Was Comments on SS)

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Tue, 30 Jul 1996 15:35:20 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19960730193520.00727eb0@mindspring.com>

Rendered body type: text/plain

I realize that most of the concern is over the "lower" bands, but I'm
wondering if there something to learn on 900MHz. Metricom has done a pretty
good job of blanketing the Bay Area with their 900 MHz FHSS system. A large
part of the area has at least 4 or 5 wired access points per square mile.
See http://www.metricom.com/ricochet/coverage/mmap0701.gif for the covered
areas. According to their second quarter report, they have about 3000
subscribers to generate activity. The Bay Area also has a few 900 Mz
repeaters and a fair amount of ATV activity.

The question is, has there been anything detectable happening on the ATV or
FM repeaters in the area? Is anybody looking?

Lee Fry
AA0JP
lfry@mindspring.com

See my Part 15 Device info at http://www.mindspring.com/~lfry/part15.htm

87. Re: Info. on Thread

From: "Bob Hansen" <bob.hansen@bdk.com>
Date: Tue, 30 Jul 1996 14:51:00 -0700
To: ss@tapr.org
Message-ID: <Megw.1737169@banquo.fabrik.com>
Rendered body type: text/plain

>A very good point. How can I get information on this thread?
>Once a Thread has lapsed how do newcomers get the information
>that seems to already be a part of the sub-culture?
>
>'73
>Gabe Nemeth

All messages to the list are archived on the TAPR server (monthly, I
think),
and are accessible by ftp or the web.
-Bob H.

88. Re: [SS:450] Interference Testing (Was Comments on SS)

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Wed, 31 Jul 1996 09:33:43 -0800 (PDT)
To: ss@tapr.org (Lee W. Fry)
Message-ID: <199607311633.AA031470823@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Lee Fry writes:

> I realize that most of the concern is over the "lower" bands, but I'm
> wondering if there something to learn on 900MHz. Metricom has done a pretty
> good job of blanketing the Bay Area with their 900 MHz FHSS system. A large
> part of the area has at least 4 or 5 wired access points per square mile.
> See http://www.metricom.com/ricochet/coverage/mmap0701.gif for the covered
> areas. According to their second quarter report, they have about 3000
> subscribers to generate activity. The Bay Area also has a few 900 Mz
> repeaters and a fair amount of ATV activity.
>
> The question is, has there been anything detectable happening on the ATV or
> FM repeaters in the area? Is anybody looking?

Well, living somewhat on the northern edge of that region I can only
comment with limited relevance, but...

We have quite a few FHSS Metricomm radios in the vicinity. Santa Rosa
(north edge of the Metricomm map mentioned above) is supposed to get
blanket coverage soon. I'm not sure how many operating Ricochets there
are at the moment but there are at least some.
  To make matters worse, the 44.4.44/24 portion of .ampr.org (net-44) up
on the north coast of California is actually connecting to the 230 kbps
904 MHz FSK hardware with hardware at some of the our sites, both with
Ricochet and previous versions of Metricom FH h/w.

  To my knowledge, there is not a *any* other amateur use of the 902 MHz
band locally. I have never worked anyone there on narrowband modes
that I did not schedule in advance. There are quite a few Part 15 users
of the band and the number has grown in the last five years. I can't
even identify all the transmissions but there are certainly quite a
number of FH and DS SS signals. The DCD light on our 230 kbps radios
will fairly routinely show activity. I suspect that one or more of my

neighbors have 900 MHz telephones, some of which hop.

  Even so, I've almost never seen any serious QRM problem as a result of these Part 15 devices. To be sure, our system which runs under Part 97 has a lot more ERP, ~300 Watts compared to probably no more than ~4 watts for Part 15. We are also using the same antenna directivity on receive which helps us even more.

  In the past some of our high level sites have had problems with Part 15 "junk" QRM when pointed over heavily populated regions but this really hasn't been too much problem recently. One of our previous gateway locations had Part 15 (not Metricomm) in the same building on which our antenna was mounted that caused some problems but even these weren't insurmountable.

  The only longstanding source of major (but fortunately relative infrequent) QRM is not Part 15 or even coming from the near vicinity. It is AN-SPS-49/V or some close cousin of it. This is a military shipboard radar with ~270 Megawatt peak ERP (yes, 1/4 giga-watt) in the main lobe. We tend to see it a couple of times a year, particularly from high level sites that can see the Pacific Ocean and particularly when there is significant ducting going on.

  This was the situation last weekend. Hawaiian hams were reported headed for hilltops and various California hams were trying to QSO on vhf-microwave via the California-Hawaii tropospheric duct. Soon after this we experienced radar signals strong enough that the 230 kbps network began to get erratic. When k6hsj hooked a spectrum analyzer to a mid-sized yagi pointed to the SW (ocean) and widened the resolution bandwith all the way out to 3 MHz to receive the ~8 MHz wide radar, he found >+10 dBm at the antenna! That's 10 milliwatts received which is an incredibly large signal off of almost any antenna. I figured that with a moderate size TVRO dish it should have been possible to capture on the order of 1 watt.

The tcp/ip host at the nearest coastal hilltop site quit working soon after this, not because of any RF damage but because the tremendous number of interrupts generated by the radar pulses on the DCD (not data derived) brought the software down. Unfortunately our hardware reset (running off contact closure from a Metricomm radio) also failed (:>) Things are now down until the site gets a personal visit.

  So, compared to radar QRM, the multitude of Part 15 SS signals we find here on 900 MHz are pretty insignificant and by and large have not caused too much problem to even our 1 MHz wide non-SS network. I know of no reported interference with what little amateur use of the band exists here.

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|
| |
| http://www.tapr.org/~n6gn/index.html |

89. Re: [SS:445] Re: Comments on SS

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Wed, 31 Jul 1996 18:27:19 -0700
To: ss@tapr.org
Message-ID: <v03007810ae25b0a51bbd@[192.160.122.115]>
Rendered body type: text/plain

At 2:25 PM -0500 7/29/96, Greg Jones wrote:
>Anyway -- while the amateur community might not have done extensive testing,
>industry sure is and has. The folks that want 2/440 already have
>experimental licenses on those bands to show that SS can be done on our
>bands as secondary users in order to get into our spectrum. Dewayne can
>comment more on this issue.

        A case in point. On June 10th, a company named DSC Communications Corporation in Plano, TX, filed a petition for rulemaking with the Commission for the creation of a Wireless Fixed Access Local Loop service. They plan to use CDMA technology to deliver wireless local loop services in rural and urban areas and would like the Commission to give them 'protected' access to the following frequencies:

A. 1668-1700.0/1723.5-1755 MHz
B. 2037.5-2076.0/2111.5-2150.0 MHz
C. 2110.0-2145.0/2165.0-2200.0 MHz
D. 2160.0-2198.5/2310.0-2348.5 MHz
E. 2400.0-2438.5/2160.0-2198.5 MHz
F. 2401.0-2439.5/2310.0-2348.5 MHz

For those of you who aren't up on current events, frequency pairs E and F, are right in the middle of the current amateur radio allocation at 2.4 GHz (2390-2450 MHz).

DSC is a $1.5 Billion/yr company who markets communications products all over the world. The Commission put their petition out for public comment on July 10th and assigned it RM-8837. Comments are due on August 10th.

Now there is little technical detail in their petition as to how DSC intends to make all of this work and still share the spectrum with the incumbants without causing chaos. However, you can rest assured that they have done their homework and will be able to produce the requisite sharing studies, etc., etc., etc. when the time comes. These people are very professional and are going to be a tough act to beat.

A lot of you who don't follow comings and goings at the Commission like I do, would not know that in the last year, a number of these sorts of petitions have been filed at the Commission. All of them from well heeled commercial firms, who are using some form of spread spectrum to allow them to share whatever spectrum they're going after with the incumbants. The little LEO companies who are after the 2m/70cm amateur spectrum allocations fall into this category. You can expect more of the same in the future from others.

So with all of this activity going on at the FCC with its negative implications as regards to the future of amateur radio spectrum allocations, I find that I usually have to be tranquilized & restrained everytime I read some of the postings on this mailing list with all of the constant bickering about things like 'the noise floor being raised' and how many spread spectrum users can dance on the head of a pin!!

The bottom line is that if you people don't stop fighting amongst yourselves, you are going to wake up one fine day and find that the spectrum you were fighting over for your own particular use (EME, weak signal, etc.) will at best have a new sharing partner (which isn't another ham), and at worst be given to someone else. The choice is yours. You can either continue to fight and bicker or you can spend some time to find out just why the commercial companies are embracing SS technologies and spin it to your own advantage.

-- Dewayne

--
~~~~~~
Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~~

90. Re: WaveLan setup

From: Kevin Williams <kevin_williams@eee.org>
Date: Wed, 31 Jul 1996 19:49:16 -0700
To: "Robert A. Buaas" <buaas@wireless.wdc.net>
Cc: ss@tapr.org
Message-ID: <199608010251.VAA24526@tapr.org>
Rendered body type: text/plain

At 06:46 AM 7/24/96 -0700, you wrote:
>Hi Kevin--
>
>thanks for the success story.
>
>since the rest of the gang is still waiting to receive their cards
>(and I'm not home), would you consider describing the system
>configurations you used: hardware platforms, software you used
>(out-of-box driver, or one you got somewhere else; JNOS, what?),
>distance between test units... that kind of stuff. So that
>the rest of the group can benefit by reproducing your tests.
>Also, your speculation on how you plan to replace the patch
>antennas supplied with ext. antennas to increase range, if
>that's in your plan.
>
>thanks/bob

>
>

First off, let me apologize for taking so long to get this out. I have been
busy with a move and got way behind on reading my E-Mail.

I hope everyone has received there cards!!!!!!!!!!

The configuration which I used for the test was just two Windows for
Workgroups boxes. I was able to set them up in short order from the
instructions in the manual. They worked with no headaches. The distance
between the test units was about 15 feet. I wanted a quick and dirty test.
I am impressed with the diagnostics which came with the cards. It gives you
a lot of useful information. The only draw back is that both systems must
be running the diagnostic software.

Now on to the good stuff. Which I haven't had time to do.

First is to connect a directional antenna to the cards. Some discussion on
this has go on previously. Here is what was discussed.
1. Replacing the connector on the card
2. Cutting the coax to the antenna and putting a BNC connector on both ends.

When I find the time I am going to try the coax cutting method. This method
should not void the warranty, and you can try various antennas with the
cards, including the antenna which came with the card.

Now to get the cards talking to something which speaks to other hams. I am
planning on first trying to get two JNOS boxes talking to each other. Then
I'll see if I can get a TNOS box in there. The packet driver should work
with both JNOS and TNOS.

I already have the cards working on a NetWare 4.1 network. Next I plan to
talk to the NetWare server from xNOS via the WaveLAN cards.

I need to find an economical 900MHz antenna to use with the cards. Is there
anyone out there who knows of a good source?

Another subject which needs attention is the need to ID so that a narrow
band receiver can recognize it. I plan on contacting one of the software
gurus in ham radio an see if he can be of any assistance. Is there anyone
out there with any other suggestions?

Well that is what I have had the time to do, and where I am headed. I would
like to read what others are doing, or plann to do.

73
Kevin
--
Kevin Williams KN6UO
Internet - kevin_williams@eee.org
AX25 - KN6UO@KE6TXE.#SOCA.CA.USA.NOAM

91. Re: WaveLAN Card purchase

From: Jeff King <jeff@mich.com>
Date: Thu, 01 Aug 1996 00:06:52 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960801040652.0071cf44@mich.com>
Rendered body type: text/plain

>
>At 04:22 PM 7/31/96 +0000, Barry McLarnon VE3JF wrote:
>
>>So what are you guys doing about antennas? Has anyone managed to
>>scrounge or kludge a compatible connector for the one on the board, or
>>are you planning to cut the cable on the supplied antenna and splice in
>>some standard connectors?
>
>Check out page 65 of the July/August DigiKey catalog (http://www.digikey.com).
>They sure look like SMB connectors to me. Worst case, is you could replace
>the current connector on the board with a SMA connector. I'd not recommend
>any type of splicing at 900mhz.
>
>
>>
>>I'd like to compile some info on 915 MHz gain antenna sources... here's
>>the few I have so far:

>>
>
>>Swiech Communication Systems (619-748-0708):
>>
>>COY33CM9EL 9 el. rear mount yagi, 12 dBi gain, 3 ft. boom ($90)
>>
>>
>
>>
>>
>>More info, anyone?
>>
>>Barry
>
>Gain on that one is 10.0 dBd.
>
>Thats what I am using at this end of my internet link. Swiech makes a really nice
>antenna. Stainless steel hardware, RF isolated elements, real class
>act. I've had one on the tower here for a year and it hasn't fallen
>down yet! I'm putting some more of these up in the thumb area of
>Michigan for a K-12 project I am working on also.
>
>-----
>
>Comet also makes a gain 900mhz omni verticle. I've got one at a local
>ISP here in town. Its about $120. Fiberglass and nice looking. Been up
>a year and still working. I'd, however, not recommend a omni unless
>you have a compelling reason to. (I've got a community network here
>for our city)
>
>-------
>
>'Olde Antenna Lab of Denver" (actually Littleton CO, 1-303-798-5926) makes
>a interesting line of antennas. I've got one of there corner reflectors,
>$79.95, and it seems to work. I bought it because it had a much more
>predictable pattern then a yagi and had a F/B of 23db. Forward gain is
>10dBd. Its flat across the band. Dave actually did a sweep of the antenna
>he sent me and photographed the results!
>
>They also make helix's and horizontal omnis (big wheel arrays). Here is
>what his most current catalog says:
>
>33cm Horizontally Polarized Omni, 8.15dbi gain, in radome $359.95
>33cm Helix antenna, 10 turn, 15dbi gain $105.95
>
>They also make power dividers, I'm ordering one so I'll let the
>group know how good they work.
>
>If you happen to call, tell Dave I said hi.
>
>--------
>
>Also I know CushCraft and Larsen are big in 900 mhz antennas.
>
>BTW, make your links horizontal polarization. You'll avoid alot of
>problems with pagers and cell phones.
>
>
>Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

92. Re: [SS:454] Re: WaveLan setup

From: Jeff King <jeff@mich.com>
Date: Thu, 01 Aug 1996 00:19:59 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960801041959.00714694@mich.com>
Rendered body type: text/plain

At 09:55 PM 7/31/96 -0500, Kevin Williams wrote:

>
>I need to find an economical 900MHz antenna to use with the cards. Is there
>anyone out there who knows of a good source?
>

See Barry's post and the post I just forwarded to the group.

>Another subject which needs attention is the need to ID so that a narrow
>band receiver can recognize it. I plan on contacting one of the software
>gurus in ham radio an see if he can be of any assistance. Is there anyone
>out there with any other suggestions?

I wonder if you could just gate the TX? You'd be sending CW with a wideband
"noise" signal, but it might suffice. I.E. if the narrow band recievers
can detect your SS signal, they should be able to detect the 'CW' that is
being sent by the 'noise' disappearing and reappearing.

One other alternative, while possibly not 'politically correct' for this
mailing list, is to just stay within Part 15 regulations. The Wavelans I
think are only +25dBm, and your allowed +36dBm under Part 15. With a
typical coax run of 9913 (100 feet or so) you should be able to put any
Yagi on it and still comply technically with Part 15. You also don't need
to worry about content and third party restrictions with this approach
either.

Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

93. Re: [SS:453] Re: Comments on SS

From: Jeff King <jeff@mich.com>
Date: Thu, 01 Aug 1996 00:48:55 -0400
To: dewayne@warpspeed.com
Cc: ss@tapr.org
Message-ID: <1.5.4.32.19960801044855.00726aa4@mich.com>
Rendered body type: text/plain

At 08:37 PM 7/31/96 -0500, Dewayne Hendricks wrote:

>   The bottom line is that if you people don't stop fighting amongst
>yourselves, you are going to wake up one fine day and find that the
>spectrum you were fighting over for your own particular use (EME, weak
>signal, etc.) will at best have a new sharing partner (which isn't another
>ham), and at worst be given to someone else.

And I'd say that day is fast approaching.

>The choice is yours. You can
>either continue to fight and bicker or you can spend some time to find out
>just why the commercial companies are embracing SS technologies and spin it
>to your own advantage.
>
>-- Dewayne

I don't think that 'ham' radio, in its current state, will be able to
embrace Spread Spectrum. There simply are to many entrenched special
interests that have tunnel vision.

I've done demos in my area, to both computer clubs and ham radio clubs.
I've been overwhelmed by the intellegence of questions and interest I have
recieved by the computer club members. The ham clubs, by and large, gave
me blank stares. Sure, a few were interested but at least here in the
Detroit area, its mostly DX and repeater operation that interests
the 'hams'. The computer clubs have a 'vision' (read application) for
spread spectrum... the hams just considered it another 'mode'.

Presently, amateur radio has a tremendous resource in its microwave bands.
Unless we start to use them effectivly, we will surely lose them. A few
narrowband FM repeaters is not enough to justify our continued exclusive
use of these band segments.

In my opinion, I think the only way to save the microwave bands will be to
get fresh blood with a vision into the hobby. Your going to find these people
in some of the computer clubs. They want high speed internet access. Many of
them are also fasinated by radio but were discouraged by the slow speed of
packet radio and had no interest in talking on 2m repeaters.

How to do this? Step one would be to remove the restrictions on chip sequences
so the Part 15 equipment could be converted. Step two would be to get some of
the Part 15 manfacturers interested in the amateur market. I've actually spoken
with some of them regarding this, however its a real chicken and egg scenario.
They want to see a market (that doesn't exist now) before they put there resources

into offering equipment to the amateur market. One thing we that purchased the WaveLan boards could do is demo them at the computer clubs. Put one at your local library so hams in the area can tie into the internet. (At least here in Michigan, I've had good luck getting permission to put ham gateways up at the libraries). As the saying goes, 'build it and they will come'.

Just some thoughts. I know this will rub some people the wrong way but I feel that unless we show some real activity on our microwave bands, we will lose them as Dewayne suggests.

-Jeff King WB8WKA

August 1996

Original source file: ss.9608
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9608

1. [SS:457] Re: Comments on SS

From: Robert.Glassey@nmp.nokia.com
Date: Thu, 1 Aug 96 14:17:17 +0100
To: ss@tapr.org
Message-ID: <H000029202272ad2@MHS>
Rendered body type: text/plain

Hi Jeff,

> Presently, amateur radio has a tremendous resource in its microwave
> bands. Unless we start to use them effectivly, we will surely lose
> them. A few narrowband FM repeaters is not enough to justify our
> continued exclusive use of these band segments.
>
> In my opinion, I think the only way to save the microwave bands will
> be to get fresh blood with a vision into the hobby. Your going to find
> these people in some of the computer clubs. They want high speed
> internet access. Many of them are also fasinated by radio but were
> discouraged by the slow speed of packet radio and had no interest in
> talking on 2m repeaters.

I agreed. This is exactly what we need. Lets stop threatening other hams (at least in their eyes) and move into a band and application that everyone can get behind and become enthusiastic about, without fearing the loss of their other interests on other bands. Sure SS could be done there, but why provoke people? We want cooperation here, the Microwave bands are better suited to out purposes anyway, and we need to show the authorities that we are capable of using them in a way that warrents these bands being allocated to the experimental amateur service.

I agree about packet too. I cant be bothered with that when I have a telephone modem. But a high speed SS HAM-LAN, thats something to get interested in, as is the experimentation that will lead to its development (even more interesting).

> How to do this? Step one would be to remove the restrictions on chip
> sequences so the Part 15 equipment could be converted.

Not being in the US, I dont have quite the same direct interest in what the FCC does, but it seems to me that if they are happy to allow many chip sequences for part 15, they should have no problems with hams. Another possibility would be to transmit a CW/RTTY/PACKET ID every 10-30 minutes or so giving callsign and generator polynomial. Along with a regulation requiring a transmission each time the polynomial is changed.

I gather here in the UK the authorities are uncertian about SS and are presently in negotiations with the RSGB regarding its legality here.

I'm not sure what the rules are regarding the part 15 bands, but is it possible for amateurs to experiment here with home built equipment or is type apporval/licences required?

> Step two would
> be to get some of the Part 15 manfacturers interested in the amateur
> market. I've actually spoken with some of them regarding this, however
> its a real chicken and egg scenario. They want to see a market (that
> doesn't exist now) before they put there resources into offering
> equipment to the amateur market. One thing we that purchased the
> WaveLan boards could do is demo them at the computer clubs. Put one at
> your local library so hams in the area can tie into the internet. (At
> least here in Michigan, I've had good luck getting permission to put
> ham gateways up at the libraries). As the saying goes, 'build it and
> they will come'.

An excelent idea! and without stepping on the toes of fellow hams either. We need to build up interest, and this may well do the trick.

The next step is to get it on the ham bands so we can really get stuck in and develop something for hams. I reckon if we can get some sort of guidelines (see my previous post) agreed amounst experimenters, then the ham population in general will support us, rather than getting

defensive.

We may be able to bridge the gap with manufacturers with transverter
kits - create a market and we're away!

Cheers,

Rob

2. Re: [SS:453] Re: Comments on SS

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Thu, 1 Aug 1996 09:40:09 -0400
To: ss@tapr.org
Message-ID: <200B45F0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

I couldn't agree more, Dewayne. Its really frustrating when you want a
particular technology to move forward, but ignorance blocks its path.
Its obvious that spread spectrum technology is a realiable modulation
scheme; why would so many companies pour millions of dollars into
research and development? Remember, these companies want to make money
and they wouldn't spend their money on something that won't make them
more money.

One thing hams will have to get use to is the constant invasion of the
ham bands by commerical companies. No matter how loud we complain,
some of the bands will used up by competting companies, LEO's and the
like. With so much money to be made in the communications market, its
inevitable. Brace yourselves - its going to be a rough ride.

73s de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:453] Re: Comments on SS
Author: ss@tapr.org at BALT.SMTP
Date: 7/31/96 8:37 PM

At 2:25 PM -0500 7/29/96, Greg Jones wrote:
>Anyway -- while the amateur community might not have done extensive testing,
>industry sure is and has. The folks that want 2/440 already have
>experimental licenses on those bands to show that SS can be done on our
>bands as secondary users in order to get into our spectrum. Dewayne can
>comment more on this issue.

A case in point. On June 10th, a company named DSC Communications
Corporation in Plano, TX, filed a petition for rulemaking with the
Commission for the creation of a Wireless Fixed Access Local Loop service.
They plan to use CDMA technology to deliver wireless local loop services in
rural and urban areas and would like the Commission to give them
'protected' access to the following frequencies:

A. 1668-1700.0/1723.5-1755 MHz
B. 2037.5-2076.0/2111.5-2150.0 MHz
C. 2110.0-2145.0/2165.0-2200.0 MHz
D. 2160.0-2198.5/2310.0-2348.5 MHz
E. 2400.0-2438.5/2160.0-2198.5 MHz
F. 2401.0-2439.5/2310.0-2348.5 MHz

For those of you who aren't up on current events, frequency pairs E and F,
are right in the middle of the current amateur radio allocation at 2.4 GHz
(2390-2450 MHz).
DSC is a $1.5 Billion/yr company who markets communications
products all over the world. The Commission put their petition out for
public comment on July 10th and assigned it RM-8837. Comments are due on
August 10th.
Now there is little technical detail in their petition as to how
DSC intends to make all of this work and still share the spectrum with the
incumbants without causing chaos. However, you can rest assured that they
have done their homework and will be able to produce the requisite sharing
studies, etc., etc., etc. when the time comes. These people are very
professional and are going to be a tough act to beat.
A lot of you who don't follow comings and goings at the Commission
like I do, would not know that in the last year, a number of these sorts of
petitions have been filed at the Commission. All of them from well heeled
commercial firms, who are using some form of spread spectrum to allow them
to share whatever spectrum they're going after with the incumbants. The

little LEO companies who are after the 2m/70cm amateur spectrum allocations fall into this category. You can expect more of the same in the future from others.

        So with all of this activity going on at the FCC with its negative implications as regards to the future of amateur radio spectrum allocations, I find that I usually have to be tranquilized & restrained everytime I read some of the postings on this mailing list with all of the constant bickering about things like 'the noise floor being raised' and how many spread spectrum users can dance on the head of a pin!!

        The bottom line is that if you people don't stop fighting amongst yourselves, you are going to wake up one fine day and find that the spectrum you were fighting over for your own particular use (EME, weak signal, etc.) will at best have a new sharing partner (which isn't another ham), and at worst be given to someone else. The choice is yours. You can either continue to fight and bicker or you can spend some time to find out just why the commercial companies are embracing SS technologies and spin it to your own advantage.

-- Dewayne

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Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AOL: HENDRICKS
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854   !
~~~~~~

3. trough reflectors

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Thu, 1 Aug 1996 11:53:53 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960801115211.2675C-100000@zeus>
Rendered body type: text/plain

Jeff:

Thanks for posting the pointers on 900 MHz. antennas.

But:
Does any know of any suppliers of 900 MHz. and 1.2 GHz. trough reflectors? (for the same footprint trough reflectors get you another 2 dB of gain over a corner reflector).

Bernie

4. 900 MHz antenna information

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Thu, 1 Aug 1996 09:45:57 -0800 (PDT)
To: ss@tapr.org (Bernie Doehner)
Message-ID: <199608011645.AA031057957@hpsadr2.sr.hp.com>
Rendered body type: text/plain

In case any one wants to *build* a 900 MHz antenna rather than buy one there is information on my web pages at:

http://www.tapr.org/~n6gn/antenna/antenna.html

There is information there on the ~13 dbd yagi we are currently using on the 230 kbps backbone radios.

  I will now excercise extreme restraint and not make more than this single commente about the low liklihood of amateurs building *anything*.

Glenn n6gn

5. Re: [SS:461] 900 MHz antenna information

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Thu, 1 Aug 1996 17:37:06 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960801173349.245A-100000@zeus>
Rendered body type: text/plain

On Thu, 1 Aug 1996, Glenn Elmore wrote:

>

> In case any one wants to *build* a 900 MHz antenna rather than buy one
> there is information on my web pages at:
>
> http://www.tapr.org/~n6gn/antenna/antenna.html
>
> There is information there on the ~13 dbd yagi we are currently using on
> the 230 kbps backbone radios.

Thanks for posting the information.

>   I will now excercise extreme restraint and not make more than this
> single commente about the low liklihood of amateurs building *anything*.

I knew that was coming from miles away. Just keep in mind that not
everyone owns test equipment necessary to properly build/adjust antennas
for 900 MHz, unless you care to loan me a Bird + slugs?

Bernie

6. Re: [SS:460] trough reflectors

From: Jeff King <jeff@mich.com>
Date: Thu, 01 Aug 1996 18:39:10 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960801223910.0070b34c@mich.com>
Rendered body type: text/plain

At 10:52 AM 8/1/96 -0500, you wrote:
>Jeff:
>
>Thanks for posting the pointers on 900 MHz. antennas.
>
>But:
>Does any know of any suppliers of 900 MHz. and 1.2 GHz. trough
>reflectors? (for the same footprint trough reflectors get you another 2
>dB of gain over a corner reflector).
>
>Bernie

Call up Dave. He seems willing to make what you want.
>
>
>
Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

7. Re: [SS:462] Re: 900 MHz antenna information

From: Jeff King <jeff@mich.com>
Date: Thu, 01 Aug 1996 20:23:13 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960802002313.007177d8@mich.com>
Rendered body type: text/plain

At 04:35 PM 8/1/96 -0500, Bernie Doehner wrote:
>On Thu, 1 Aug 1996, Glenn Elmore wrote:
>
>>
>> In case any one wants to *build* a 900 MHz antenna rather than buy one
>> there is information on my web pages at:
>>
>> http://www.tapr.org/~n6gn/antenna/antenna.html
>>
>> There is information there on the ~13 dbd yagi we are currently using on
>> the 230 kbps backbone radios.
>
>Thanks for posting the information.
>
>>   I will now excercise extreme restraint and not make more than this
>> single commente about the low liklihood of amateurs building *anything*.
>
>I knew that was coming from miles away. Just keep in mind that not
>everyone owns test equipment necessary to properly build/adjust antennas
>for 900 MHz, unless you care to loan me a Bird + slugs?
>
>Bernie

My bird wattmeter was one of the best invests I've made. Decent test

equipment can really make a difference. Its not that hard to build
antennas for 900mhz, I've built a number of helical antennas for
my 440 and 900mhz data experiments. Nice thing about a helical is that
it tends to cancel (to a degree) any multipath. I bought my Bird new
for $265 and a 800mhz-1ghz 1 watt slug was (I think) $80. You can get
Bird 43's used in the $150 range.

The problem I have had with my homemade antennas is they generally don't
last a through the winter. A antenna that can withstand 1 inch ice loads
in 40-60 mile an hour winds is less a electronics project and more of a
mechnical project.

-Jeff WB8WKA

8. Re: [SS:457] Re: Comments on SS

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Thu, 1 Aug 1996 18:10:49 -0700
To: ss@tapr.org
Message-ID: <v03007830ae270039077e@[192.160.122.115]>
Rendered body type: text/plain

At 11:35 PM -0500 7/31/96, Jeff King wrote:
>Presently, amateur radio has a tremendous resource in its microwave bands.
>Unless we start to use them effectivly, we will surely lose them. A few
>narrowband FM repeaters is not enough to justify our continued exclusive
>use of these band segments.
>
>In my opinion, I think the only way to save the microwave bands will be to
>get fresh blood with a vision into the hobby. Your going to find these people
>in some of the computer clubs. They want high speed internet access. Many of
>them are also fasinated by radio but were discouraged by the slow speed of
>packet radio and had no interest in talking on 2m repeaters.

Alas, I don't think that trying to increase ham activity in the
microwave bands in either the short or the long term is going to stem this
tide. There are currently actions at various stages of the rulemaking
process at the Commission that effect amateur radio allocations in the 0.9,
1.2, 2.3, 2.4 and 5.7 GHz bands. So in about a year to eighteen months,
you can expect the status of those bands to change in some way with a
probable negative impact on the amateur radio service. The really sad
thing is that most hams are not even aware that these actions are currently
in progress. I would say that some may have heard of the Supernet/NII Band
NPRM action at 5.7 GHz, but thats probably about it (correct me if I'm
wrong about this). In any case, you're talking about a hell of a lot of
spectrum that could very well change hands when you add up all of the
amateur radio allocations in those bands (exercise left to the reader).
So while I like a lot of what you had to say Jeff, I think that we
are going to need a lot more then 'fresh blood with a vision' to get the
service out of the spectrum whirlpool that it is descending into. We
recently witnessed a great hue and cry whipped up by the ARRL over the
2m/70cm Little LEO companies actions. Where may I ask, is the same level
of effort and support to prevent the loss of our precious microwave
spectrum allocations? Believe me, your action can make a difference in
these matters. Your silence sure as hell won't!!!

-- Dewayne

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Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~~

9. Re: [SS:465] Re: Comments on SS

From: Steve Sampson <ssampson@othello.tinker.af.mil>
Date: Thu, 01 Aug 1996 20:52:29 -0500
To: ss@tapr.org
Message-ID: <32015F5D.3E4E@othello.tinker.af.mil>
Rendered body type: text/plain

Dewayne Hendricks wrote:
>
> Alas, I don't think that trying to increase ham activity in the
> microwave bands in either the short or the long term is going to stem this
> tide.

Nor should they.

There is a fear in this country that change is bad. In this case I
disagree.
The microwave bands are completely empty of activity. The allocation is
a
relic of the socialist era. Would you rather hold on to the empty band,
or
use the band to generate new jobs and applications? The theory is, that
we
would lose the band (bad, bad) and some other segment of "The People"
would
then get it. Well those other people turn out to be us again. If I
lose
3 GHz to commercial "People" who generate jobs and sell me a product
that
makes my life better (good, good), then I feel it's worth it.

The ARRL in most spectrum cases sounds like any big city Mayor when
confronted
with the Welfare Bill in Congress. That is, we should keep our spectrum
because it was given to us by FDR, (as most socialism started back then)
and
LBJ and that's that, it's a right. If Hams lose spectrum, then they
will starve
as much as the unwed teen without a handout...

We've been discussing Spread Spectrum, and in most cases we are now
grabbing
commercial gear from Part 15 and thinking we can use that in Part 97.
Well,
that's absurd, why not just use it as a Part 15 device? In most cases,
the
power is good enough, and I can use it to order a pizza without causing
my
fellow Hams to call their Congressman or the ARRL :-)

The whole idea with SS is reutilization, and I think some repeater on
the
hill that everyone aims at, is not where we should be headed. Low power
LAN use is more appropriate. Every neighborhood should have a Server,
and
Servers should be "backboned." That sort of topology.

My favorite design by a high school student for his Engineering
competition
was a LED Laser device that everyone puts on their roof. All homes in
the
neighborhood are linked together this way for phone and computers. The
device
on the roof looked like a prism with many cut sides to handle all the
angles
between homes. Only one home would be tied to the "Backbone" trunk.
That's
more what I think is needed. I think as speed goes up, then latency
becomes
more of the percentage, but still insignificant in the big picture.

Steve, N5OWK
"Socialism is just plain evil" - The Tick

10. Friendly SS tests

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 2 Aug 96 12:56:20 +0100
To: ss@tapr.org
Message-ID: <H00002920221b4c7@MHS>
Rendered body type: text/plain

>>   I agree: the best way to put this issue to rest is to conduct a
>>   massive series of tests, in all frequency bands, in all possible

> It's unrealistic to actually do as you suggest as a small band of hard

> core 'extreemists' as some might see us. Many hands make light work!

>   I don't think conducting 4 or 5 tests is unrealistic. All I am
>   suggesting is build the transmitter and turn it on. The
>   transmitter will automaticly transmit the sequence, so no

> operator is needed. Next you would need to find a few hams who
> are up to the task (I'm sure you can find some at a local radio

I was thinking along the lines of a massive series of test'. While a
small number of tests may convince the SS community, and maybe even the
members of that local club involved, this falls well short of what is
required to convince the general amateur community at large.

What we need is lots people doing 'friendly' experiments in their local
area worldwide. This way people many people will come into contact with
real spread spectrum, and can be much more easily satisfied that it does
not effect them. Something like this does not happen over night. What is
needed is for the path to be made a little smoother, and the waters to
be made considerably calmer, so people will be encouraged to try it
rather than oppose it.

If people can see that experimenters are taking extreem care NOT to
cause interfrence of any type, actual or potential, and respect the
rights of the other users of the band, then they will be more agreeable
to spread spectrum.

> I believe there is another way Tony. (Read my suggested guidelines for

> SS experimentation). If we can convince people of the *much easier*
> task that a *very limited* type of SS operation will not hurt them,
> then we will encourage many operator to take up the mode, relax
> peoples fear of the worst and let them see what real spread spectrum
> is capable of. It also gives us a chance to work out the best
> techniques to oviod any potential problems and delelop this technology

> to maturity.

Cheers,

Rob

11. Re: [SS:466] Re: Comments on SS

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 2 Aug 1996 09:02:47 -0400
To: ss@tapr.org
Message-ID: <201FFA40.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Steve,

I like your social commentary. You also sound like a Republican -
another reason to like you :) Politics aside, the agrument over
spread spectrum use in the amateur bands is amazing to watch. There
are definitely groups of hams who see the ham bands as their own and
don't want this "foreign" modulation method to invade "their" turf. As
to this date, I have yet to read a convincing argument that SS will
cause anymore interference than a narrowband modulation method.

Its very simple guys (and gals): is SS interference occurs, we correct
the problem. The same way we do if it occurs with a narrowband
modulation method.

73 de
Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:466] Re: Comments on SS
Author: ss@tapr.org at BALT.SMTP
Date: 8/1/96 9:06 PM

There is a fear in this country that change is bad. In this case I
disagree.
The microwave bands are completely empty of activity. The allocation is
a
relic of the socialist era. Would you rather hold on to the empty band,
or
use the band to generate new jobs and applications? The theory is, that
we
would lose the band (bad, bad) and some other segment of "The People"
would
then get it. Well those other people turn out to be us again. If I
lose

3 GHz to commercial "People" who generate jobs and sell me a product
that
makes my life better (good, good), then I feel it's worth it.

The ARRL in most spectrum cases sounds like any big city Mayor when
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with the Welfare Bill in Congress. That is, we should keep our spectrum
because it was given to us by FDR, (as most socialism started back then)
and
LBJ and that's that, it's a right. If Hams lose spectrum, then they
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as much as the unwed teen without a handout...

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grabbing
commercial gear from Part 15 and thinking we can use that in Part 97.
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that's absurd, why not just use it as a Part 15 device? In most cases,
the
power is good enough, and I can use it to order a pizza without causing
my
fellow Hams to call their Congressman or the ARRL :-)

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the
hill that everyone aims at, is not where we should be headed. Low power
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and
Servers should be "backboned." That sort of topology.

My favorite design by a high school student for his Engineering
competition
was a LED Laser device that everyone puts on their roof. All homes in
the
neighborhood are linked together this way for phone and computers. The
device
on the roof looked like a prism with many cut sides to handle all the
angles
between homes. Only one home would be tied to the "Backbone" trunk.
That's
more what I think is needed. I think as speed goes up, then latency
becomes
more of the percentage, but still insignificant in the big picture.

Steve, N5OWK
"Socialism is just plain evil" - The Tick

12. RE: Re: Comments on SS.

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 02 Aug 96 07:19:33 UTC
To: ss@tapr.org
Message-ID: <10785@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Steve and Dwayne.

 Steve,

  Come ON! That s a real stretch now isn t it. FDR may have had socialist
goals in a time when a complete change to comunism was a problem. But, its
been the lack of retuning by the government, in the time since FDR that
has caused allot of the problems. Besides, NOBODY can call Teddy Roosevelt
a socialist! And he was responsible for the thinking in government that really
resulted in our microwave allocations. He set up the national park system,
as a enjoyable recreation place, today, and a RESERVE of the natural resources
for the future. All the possible uses for radio spectrum will NEVER be known,
and having none in reserve prevents future experimentation. Locks in what was.
This really sounds allot like what u are complaining about, now doesn t it?
Allot of the more socialist things that FDR did have been locked in since
then. If we let the spectrum get converted, are we not going down the SAME
road that the government has since FDR?

  Right now, all the applications are strickly along the lines of the Cellular
Telephone model. But there are other architectures out there. Directivity
Division, for one, that has been proposed on other news groups, is only used
in Space Comunication, to date. The ham data application is an idea place to
put Directivty Division to its full use, in terrestrial radio networks. NONE
of the people that want the ham bands are doing this.

The lack of moneyed groups to know all the future possible architectures, and radio technology is the main reason the ham radio spectrum should be maintained as a reserve. The Directivty Division technigues is an example of this. Its overlooked today. If one performance enhancing technigue is over-looked, there are probably others as well.

Its time the government abandoned its socialistic practices, and KICKED some of the locked in WELFARE MOTHER commercial services off the dole. Rather than take away resources from the working middle class whole. Time for allot of these inefficient 2-way systems to go to cellular. Time for TV to use less spectrum.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

13. re:[SS:464] Re: 900 MHz antenna information

From: "gabe (g.) nemeth" <gabe@nortel.ca>
Date: Fri, 2 Aug 1996 10:35:00 -0400
To: ss@tapr.org
Cc: "gabe (g.) nemeth" <gabe@nortel.ca>
Message-ID: <"16274 Fri Aug 2 10:35:10 1996"@bnr.ca>
Rendered body type: text/plain

In message "900 MHz antenna information", ss@tapr.org writes:

> ..CLIP...
> The problem I have had with my homemade antennas is they generally don't
> last a through the winter. A antenna that can withstand 1 inch ice loads
> in 40-60 mile an hour winds is less a electronics project and more of a
> mechnical project.
>
> -Jeff WB8WKA

A very good point. This may open an interesting area of discussion.
How does one protect home-brew antennas from the environment?

I have most of my antennas north of Orillia Ontario. Canadian winters can get reasonably fierce. I silicon ALL the soldered parts and spray the metal with clear shellac spray - one that is not water based. My antenna mast is painted with Armor-all paint, and all bolts are stainless steel mated with stainless aircraft nuts/washers. This seems to make antennas last a bit longer. Does any one else at TAPR have any input? I would like to hear how people protect antennas from salty sea-side conditions as well.

Thanks for reading, '73 VE3-SLJ
Gabe.
..

>
>

14. Re: [SS:469] RE: Re: Comments on SS.

From: ATVQ@aol.com
Date: Fri, 2 Aug 1996 12:47:39 -0400
To: ss@tapr.org
Message-ID: <960802124739_375870226@emout13.mail.aol.com>
Rendered body type: text/plain

Maybe you didnt notice, but broadcast digital TV wll take the same spectrum (thanks to a lot of digital crunching to make it fit, cause it is 8 times less efficient in baseband than analog). Digital, cellular, etc is not the cure all panacea for spectrum useage. The application determins the most desireable modulation scheme. Digital radio flunked out because of drop outs when you go between buildings, where analog FM still works fine. Figure it out...digital is not for everyting. 73 henry kb9fo

15. [SS:468] Re: Comments on SS

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 2 Aug 96 17:50:06 +0100
To: LANIER.R.A-@smtpgty.bwi.wec.com, ss@tapr.org
Message-ID: <H000029202299223@MHS>
Rendered body type: text/plain

Tony wrote:
> Its very simple guys (and gals): is SS interference occurs, we

> correct the problem. The same way we do if it occurs with a
> narrowband modulation method.

Not quite that simple, but its the right approach. For a few
experimenters doing very occasional tests, yip thats fine. But if we
want SS to become more popular we need to consider the effects of many
users, and how this adhoc system may fall over if there is interference
and the guys suffering dont know where it is comming from, or feel a
little intimidated, dispondent, or overwhelmed buy the idea of
confonting a number of people regarding the inetrference. Once something
gets established, and if it does cause interference, the camps will be
fixed into a nasty battle for the spectrum, with nobody wanting to give
up what they have gained, dispite the two not being compatible (if thats
how it turns out)

We must ensure that this does not happen. For this reason, we need
something a little more than an adhoc intention to correct any
interference. We must *ensure* it does not happen in the first place.
Only this will reassure people that we will not cause them interference.

This means starting small and slowly growing to a point where everyone
is happy with the situation. SS (like any new technology) is going to
grow slowly any way, so why take more than we need? We can develope and
prove this technology with very low power, well filtered outputs,
microwave frequencies, directional antennas, and high processing gain,
without causeing any interference to anyone. We can use ISM bands where
appropriate too.

So lets spell this out in guidelines, and get on with it with the
support of other hams.

Rob

16. Re: [SS:457] Re: Comments on SS

From: ATVQ@aol.com
Date: Fri, 2 Aug 1996 20:07:15 -0400
To: ss@tapr.org
Message-ID: <960802200714_170584989@emout12.mail.aol.com>
Rendered body type: text/plain

Tell that to the MACC idiots! (or spoc or NFCC or whatever)

17. Re: [SS:455] Re: WaveLAN Card purchase

From: ATVQ@aol.com
Date: Fri, 2 Aug 1996 20:06:13 -0400
To: ss@tapr.org, TOMSMB@aol.com
Message-ID: <960802200613_170584975@emout10.mail.aol.com>
Rendered body type: text/plain

Have you seen the latest super circuits catalogue? It chuck full of
equipment being sold/marketed to non hams that is in the ham bands. Not part
15 stuff for 900, but powerful stuff for 70 cm, 33 cm, 23 cm, 13, cm
 advertised for police surveilence, employee spying, etc, and not one mention
of a ham license is required, or the units may experience interference from
hams and other LICENSED users.   Just another case...... 73 Henry

18. Re: [SS:471] RE: Re: Comments on SS.

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sat, 3 Aug 1996 01:58:20 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199608030158.BAA15426@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

> Maybe you didnt notice, but broadcast digital TV wll take the same spectrum
> (thanks to a lot of digital crunching to make it fit, cause it is 8 times
> less efficient in baseband than analog). Digital, cellular, etc is not the
> cure all panacea for spectrum useage. The application determins the most
> desireable modulation scheme. Digital radio flunked out because of drop outs
> when you go between buildings, where analog FM still works fine. Figure it
> out...digital is not for everyting.   73 henry kb9fo

The fact that digital radio (I assume you're speaking in the context of
broadcasting) "flunked out" will come as a nasty surprise to the
numerous countries which are busily implementing it. The fact that the
USA is not one of them has a lot more to do with politics and economics
than technical issues. Analog FM has lots of problems in multipath
environments, and digital techniques can solve them. However, the real
point to be made here is that an enormous amount of prime VHF and UHF

spectrum is squandered on TV. It doesn't matter whether it's analog or digital, it's still a misuse of the spectrum when there are alternate forms of delivery (cable, satellite, short-range microwave) available. The bandwidth allocated to terrestrial TV transmission should be reduced substantially, and given over to the mobile services which really need it - the so-called "Negroponte flip".

All of which has little to do with the subject matter of this list, but what the hell - it's Friday. :-) Come to think of it, maybe it is relevant - if the broadcasters would cough up some of their spectrum (not likely, but the top 23 or so UHF TV channels did go to make room for cellular telephone), maybe there'd be less pressure from commercial interests to suck up the ham bands.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

19. Re: [SS:475] RE: Re: Comments on SS.

From: ATVQ@aol.com
Date: Sun, 4 Aug 1996 09:15:35 -0400
To: ss@tapr.org
Message-ID: <960804091534_252437473@emout10.mail.aol.com>
Rendered body type: text/plain

Well Barry, it was the top 13 channels, not 23. There is no alternative to over-the-air broadcasts for many reasons. Top most is there is a multi-billion dollar business attached to over-the-air broadcasts, because there is still a substantial audioence which will never have cable, and doesn't now, there are 220 individual TV markets which make billions more on local programming, plus local news, etc. The UHF spectrum will be condensed if HDTV broadcasting replaces NTSC broadcasting, but the spectrum saved is only the "taboo" spectrum, which could have been recovered if TV set maufacturers had used 300 MHz IF frequency instead of a 45 MHz IF frequency. So in 20 or 30 years, if NTSC replaces digital, the rich fat cats at Motorola will get richer and fatter selling cellular phones, personal computer wirelss modems and a host of non essessntial 2-way radio stuff to ma and pop businesses.
Meanwhile the Japanese electronics firms will get fat and rich selling digital TV sets, VCR's etc.   Oh by the way Barry, you are going to pay the hundreds of billions of dollars to pay for all this. I aint! 'cause I'm keeping my NTSC video stuff and have a large collection of NTSC video recorders etc to last till I'm dead and buried. In case you hadn't heard, it is estimated that the switch to digital TV broadcasting will cost each and every consumer over $15,000 during their lifetime. Hope your piggy bank is full. As for me, I can have a lot more fun with that $15 grand than waste it on hocus pocus BS HDTV digital. The final determiner of video quality is the human eye, which has a finite limit to resolution, which is met by a properly working NTSC signal at a normal viewing distance. HDTV will not change that, and digital forms all have less resolution, not more. A lot will be missing from ditigal TV, including smooth motion and anti-aliasing for edge artifacts. But heck, if you are happy with blocky game boy graphics, you'll love digital HDTV....forget abot texture, graceful blending and shading, get ready for sharp contours and jagged edges and block movement.
If you want an advance preview, go rent the movie, Lawrence of Arabia. There is a scene where the army is marching on horse/camel back through the valley, Lawrence is on a hill top observing from behind a well. There are other hills/mountains int he background. There is a white painted top edge to the well. Now slow the tape down to where you can watch every frame. What you will notice is that the well sides appear and disapear in sets on alternate frames. The rocks move left and right, some there and then not there in each frame, and the horses/camels only have two or three legs, as they are left out of every other frame. Yep digital sure is neat. Only half the information per picture, flicker, 2 legged horses, hillsides that move, and a well that comes and goes. There is visible flicker in the picture at regular speed, and its obnoxious at slower speeds and rediculous frame by frame. And that is a slow action scene. In faster motion, the effect is even worse.
  This was not some cheap film transfer, it was a letter box state of the art digital transfer, with digital noise reduction etc at enormous cost. I know becuase I was the manager in charge of video duplication of a hundred million movies a year and more. And it wasn't the VHS tapes, this effect is on the digital D1 masters.
     You can chop a lot out of voice information to digitize it, because ears are not sensitive to drop outs, digital holes, etc. Our brains fill in a lot in sound and pictures. Persistance of vision permits motion with limited

frame rate, and persistance of hearing allows us to hear tiny fractions of a sound as a complete sound, but sooner or later you get tired of the flicker, and sooner or later you realize your CD is gritty and the vynal record isn't. If you don't notice these...too bad, if you do, then you recognize that you are getting 30 cents value for your dollar. Digital is best on limited bandwidth delivery systems like phone lines and papercup/string applications. The rest of us want all Rembrandt and Motzart had to offer. Its too bad you think it is a waste of spectrum to enjoy it in a faithfull reproduction. Good luck on your minimum communication wire line/narrowcasting system.

73 Henry KB9FO

20. Re: [SS:476] RE: Re: Comments on SS.

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Sun, 4 Aug 1996 12:21:21 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.960804120355.258C-100000@zeus>
Rendered body type: text/plain

On Sun, 4 Aug 1996 ATVQ@aol.com wrote:

[deleted long/irrelevant text that has nothing to do with Spread Spectrum]

Enough is enough!

Can we please get back to the topic of this mailing list? I subscribed to this list for the purpose of learning about and discussing spread spectrum and SS system installation/implementation and NOT for reading how wonderful Henry things that NTSC is.

If I wanted to discuss ATV, I would either join an ATV mailing list or sponsor my own ATV mailing list, but it certainly has no place on this mailing list.

Thanks...

Now, that that's off my chest - could we please have some more Wavelan system implementation descriptions? I know that more than the couple of people that posted descriptions bought Wavelan cards in the recent group purchase (thanks Jeff/Kevin).

What I am especially interested in are wavelan systems that use one or more intermediate repeaters. Because of the distance/terrain involved in my "proposed" system, I will need at least one Wavelan repeater system, and I would very much like to hear from people who have already set up such systems. My intended OS is FreeBSD (preferably) or Linux.

Thanks.

Bernie nu1s

21. Wireless Firmware

From: bbaker@microagewny.com
Date: Sun, 4 Aug 1996 14:09:46 -0400
To: ss@tapr.org
Message-ID: <199608041809.OAA18340@microagewny1.microagewny.com>
Rendered body type: text/plain

Is anyone working on developing a multi-point to multi-point firmware for serial wireless lan devices ? So far it would seem most companys I've confronted with this subject are flooded with requests for firmware with this capability, yet there is no serious signs of progress.

Multipoint to multipoint with multi-connect is the goal.

If anyone in the TAPR forum is working on this for amateur applications I'd welcome any feed back.

Thanks. Brian Baker kd2dl bbaker@microagewny.com

22. Re: [SS:478] Wireless Firmware

From: Jerry Normandin <jerryn@ici.net>
Date: Sun, 04 Aug 1996 20:42:58 -0400
To: ss@tapr.org
Message-ID: <32054392.60756161@ici.net>
Rendered body type: text/plain

bbaker@microagewny.com wrote:
>
> Is anyone working on developing a multi-point to multi-point firmware
> for serial wireless lan devices ? So far it would seem most companys
> I've confronted with this subject are flooded with requests for firmware
> with this capability, yet there is no serious signs of progress.
>
> Multipoint to multipoint with multi-connect is the goal.
>
> If anyone in the TAPR forum is working on this for amateur applications
> I'd welcome any feed back.
>
> Thanks. Brian Baker kd2dl bbaker@microagewny.com
>
>
What I do for Serial Multipoint to Multipoint is purchase
wireless modems with the "passthrough" capability. This will
allow you to have the radio to listen to all traffic. Your
software will do the work. I have modified the AX.25 code for Linux
to support my Proxim Modems I gor cheap. The code isn't 100% yet
but it's almost there. I have NO PLANS to port the code to Miscrosoft.
I am very anti microsoft now. I developed code 7 years ago thatfixed an
interrupt latenct time problem in windows and allowed you to play
sound files from your soundblaster without heating the pooping noises
.... well I was promised many things, they even signed a non-disclosure.
I never got any cash. Microsoft Suck and they only steal from people.
I didn't sue... I don't believe in it. Instead I am designing code for
the Linux Operating System. I hope one day it will take a massive bite
out od there market share!

Anyway the Proxim Modems support pass-though mode.. any modem that
supports pass-through will get your job done!

23. Re: WaveLAN Card purchase

From: "Doug Crompton (Administrator)" <admin@marconi.crompton.com>
Date: Mon, 5 Aug 1996 00:21:58 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.960805002000.1423C-100000@marconi.crompton.com>
Rendered body type: text/plain

I have not been paying attention! Since this is one of about 50 groups
I get. I suspect it is way to late to get in on this? Will there be
another one?

Doug

****
* Doug Crompton
* Richboro, PA 18954
* 215-355-5307
*
* doug@crompton.com
* wa3dsp@wa3dsp.ampr.org
* http://www.resuba.com/wa3dsp
****

24. [HFSIG:1428] Re: Advantages of SS (fwd)

From: Greg Jones <wd5ivd@tapr.org>
Date: Mon, 5 Aug 1996 00:43:25 -0500 (CDT)
To: ss@tapr.org (Spread Spectrum)
Message-ID: <199608050543.AAA29159@tapr.org>
Rendered body type: text/plain

This was posted by Phil on the HF SIG -- thought that several on here might
like to see it.

There is a discussion on the HF SIG about SS on HF. :-)

Greg

Forwarded message:
>From hfsig@tapr.org Mon Aug 5 00:34:30 1996
Date: Mon, 5 Aug 1996 00:21:17 -0500 (CDT)
Message-Id: <199608050500.WAA01008@unix.ka9q.ampr.org>
Reply-To: hfsig@tapr.org
Originator: hfsig@tapr.org
Sender: hfsig@tapr.org

Precedence: bulk
From: Phil Karn <karn@unix.ka9q.ampr.org>
To: hfsig@tapr.org
Subject: [HFSIG:1428] Re: Advantages of SS
X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
X-Comment: Tucson Amateur Packet Radio HF Special Interest Group

>1) If assumed that the center frequency of different DS SS operations are
>randomly chosen, what would that do to the near-far problem, i.e., if you
>use DS SS and experiencing interference from your neighbor DS SS operator,
>why not QSY out of harm's way of the offending signal envelope? This assumes
>that contacts are initially established on some known frequency. Am I right
>in assuming that if only two parties are involved in DS SS, that the PSD
>does have a maxima somewhere, even though it is a wideband, i.e, not quite
>white over the full bandwidth?

Johan,

You assume that there's little if any filtering after the spreading
operation. Most real systems I know do in fact filter, both to
flatten the in-band spectrum and to knock off the sin(x)/x
sidelobes. Qualcomm CDMA uses a particularly sharp FIR filter because
of cellular carrier requirements. To get the sharp skirts we let the
passband ripple somewhat. The resulting display on a spectrum analyzer
closely resembles the top of Bart Simpson's head, so around here we
often call each composite CDMA waveform a "Bart's head".

>2) How many SS particpants does it take to start raising the noise floor to
>a point where it becomes objectionable? 2, 10, 100, 1000 ? If the number is
>1000, would it be realistic, given a comparable narrow-band situation, to
>expect anyone to be able to conduct a QSO with that occupancy? Like a
>contest with 1000 RTTY operators calling simultaneously in the 14.090 -
>14.065 20 meter segment.

This depends on the process gain, required Eb/N0s and relative signal
strengths. The math is actually pretty straightforward.

Consider a DS/SS system with coding and spreading such that an Eb/N0
of 6 dB is required and the ratio of RF bandwidth to user data rate is
128:1. (These are the approximate parameters of Qualcomm CDMA).

The process gain is 10*log10(128) ~= 21 dB. For a required Eb/N0 of 6 dB,
the overall SNR required is 6 - 21 = -15 dB. This figure is sometimes
referred to as Ec/I0, the ratio of the energy per chip to the interference
spectral density.

If everyone's power is matched at the receiver, you can tolerate as
many as 31.6 other users before their aggregate interference brings
the Eb/N0 down to 6 dB. Note this is less than the 128 users you could
theoretically support by just dividing up the total bandwidth into 128
equal size pieces. But that assumes no thermal noise, i.e., that it
would be easy to operate at the higher Eb/N0 that's required without
bandwidth-expanding coding, especially on a fading channel. It also
ignores any savings from better dynamic sharing, and it ignores the
benefits from being able to geographically reuse frequencies more
densely because of the far greater resistance to co-channel
interference.

Phil

25. Re: [SS:478] Wireless Firmware

From: Cascade Communications Pty Ltd <bruce@cascade.com.au>
Date: Mon, 05 Aug 1996 20:22:29 +0800
To: ss@tapr.org
Message-ID: <2.2.32.19960805122229.0074b970@rapid.cascade.com.au>
Rendered body type: text/plain

At 13:32 4/08/96 -0500, you wrote:
>Multipoint to multipoint with multi-connect is the goal.
>

Brian,

What nibbles have you had back? What applications do you see for this mode
of operation.

73's
Bruce, VK6XZ

26. Re: [SS:479] Re: Wireless Firmware

From: bbaker@microagewny.com
Date: Mon, 5 Aug 1996 16:35:05 -0400
To: ss@tapr.org
Message-ID: <199608052035.QAA09435@microagewny1.microagewny.com>
Rendered body type: text/plain

On Sun, 4 Aug 1996, Jerry Normandin <jerryn@ici.net> wrote:
>bbaker@microagewny.com wrote:
>>
>> Is anyone working on developing a multi-point to multi-point firmware
>> for serial wireless lan devices ? So far it would seem most companys
>> I've confronted with this subject are flooded with requests for firmware
>> with this capability, yet there is no serious signs of progress.
>>
>> Multipoint to multipoint with multi-connect is the goal.
>>
>> If anyone in the TAPR forum is working on this for amateur applications
>> I'd welcome any feed back.
>>
>> Thanks. Brian Baker kd2dl bbaker@microagewny.com
>>
>>
>What I do for Serial Multipoint to Multipoint is purchase
>wireless modems with the "passthrough" capability. This will
>allow you to have the radio to listen to all traffic. Your
>software will do the work. I have modified the AX.25 code for Linux
>to support my Proxim Modems I gor cheap. The code isn't 100% yet
>but it's almost there. I have NO PLANS to port the code to Miscrosoft.
>I am very anti microsoft now. I developed code 7 years ago thatfixed an
>interrupt latenct time problem in windows and allowed you to play
>sound files from your soundblaster without heating the pooping noises
>... well I was promised many things, they even signed a non-disclosure.
>I never got any cash. Microsoft Suck and they only steal from people.
>I didn't sue... I don't believe in it. Instead I am designing code for
>the Linux Operating System. I hope one day it will take a massive bite
>out od there market share!
>
>
>Anyway the Proxim Modems support pass-though mode.. any modem that
>supports pass-through will get your job done!
>
>
>
Ok on the proxim modems I'll check into the them. I think I did once
before but they probably didn't support the range we need or FH vers.
Direct Sequence there was some stickey wicket about them.
In particular I'm looking for a serial device eg. Freewave, Gina etc...
type modem that supports multiconnect/multipoint to multipoint.

thanks for your input

Brian

27. Re: [SS:483] Re: Wireless Firmware

From: Jeff King <jeff@mich.com>
Date: Mon, 05 Aug 1996 18:01:17 -0400
To: ss@tapr.org, ss@tapr.org
Message-ID: <1.5.4.32.19960805220117.0070ac00@mich.com>
Rendered body type: text/plain

At 03:40 PM 8/5/96 -0500, bbaker@microagewny.com wrote:

>In particular I'm looking for a serial device eg. Freewave, Gina etc...
>type modem that supports multiconnect/multipoint to multipoint.
>
>thanks for your input
>
>Brian
>
>

I've used the FreeWave's in multipoint mode. Most I had going was 4 of them
with 1 master and 4 slaves. Hooked into various PC's running Winsock's and
Mac powerbooks running (I guess) the same. The master was hooked to a
Livingston portmaster talking 115200 to the FreeWave.

All units were running Slip. They seemed to hold up fairly well. The
FreeWave in master in multipoint acks the slaves packets but the slaves

don't ack the master packets. I was depending on the IP transport layer
for this.

This is the 'broadcast' mode. There is also a mode that allows specific
slaves to be addressed (there mode 6) but never have used this.

>
>Regards,

Jeff King
jeff@mich.com
Linked to the internet via spread spectrum

28. [SS:483] Re: Wireless Firmware

From: Howard Goldstein <hg@penny.n2wx.ampr.org>
Date: Mon, 5 Aug 1996 18:04:01 -0400
To: ss@tapr.org
Message-ID: <199608052204.SAA00329@penny.n2wx.ampr.org>
Rendered body type: text/plain

bbaker@microagewny.com writes:
 > In particular I'm looking for a serial device eg. Freewave, Gina etc...
 > type modem that supports multiconnect/multipoint to multipoint.

O'Neill Connectivities

29. Re: [SS:484] Re: Wireless Firmware

From: buaas@wireless.wdc.net (Robert A. Buaas)
Date: Tue, 6 Aug 1996 10:30:22 -0700
To: ss@tapr.org
Message-ID: <199608061730.KAA27772@wireless.wdc.net>
Rendered body type: text/plain

Hi Gang--

I'd like to expand slightly on Jeff King's valuable observations:
   (a) The FreeWave product described here is a FH system, whose
radio throughput is on the order of 128 KBPS using simple FM FSK.
The AT&T WaveLAN is a 2 MBPS DS system using DQPSK modulation.
   (b) The FreeWave contains software that provides varying degrees of
agressive link layer throughput/flow control/error recovery when
operated in the point-to-point mode. This software is substantially
disabled in the point-to-multipoint mode, as slave units do NOT
acknowledge receipt of transmissions from the master unit. The WaveLAN
software contains no such link layer support (though modifications
to the driver could provide similiar features). Point-multipoint
operations are only currently supported through the use of higher-layer
protocols (such as NOS or UNIX). Phil Karn correctly points out that
agressive error correction is often required in radio systems at the
link layer, whereas it is much less required in wired systems.
   (c) FreeWave receivers, by virture of their lower channel bandwidth,
are significantly more sensitive than the WaveLAN. The FreeWave's I've
measured operate in the range of -100 to -107 dBm, whereas the WaveLAN
is specificied at -78 dBm (not yet measured).

Jeff--

since you have working systems, might you publish some user-level
(say, FTP) throughputs, contrasting both systems using an apples-to-apples
benchmark? I'm sure everyone would find this information useful.

best regards/bob

30. Wireless modem firmware

From: bbaker@microagewny.com
Date: Tue, 6 Aug 1996 23:42:16 -0400
To: ss@tapr.org
Message-ID: <199608070342.XAA06208@microagewny1.microagewny.com>
Rendered body type: text/plain

So far I've got some interesting responses for multipoint to multipoint
and multiconnect firmware.

Most of the serial ported hardware is made for point to point
applications. While some have come up with very clever ways to trick
these modems into doing multiconnect with some elaborate tcpip routing

and PC's.

The bottom line is Point to multipoint with the use of a central UNIX box
comes close but it's still *NOT True* multi-connect and multipoint firmware!

Besides I wonder who in the amateur world is going to Sponsor PC/UNIX boxes
at repeater sites to act as fancy repeater router hub's ? Thus offering the
same multiconnect capability that could of been burnt into a $1.00 27c512 EPROM
had the firmware only been engineered with smart multiconnect routing option
in the first place!

The sad fact is that many of the spread spectrum modem processors are based
on an 80x processor anyway, so plenty of source code is already out there.
GINA for example use a 80c188 which is basically a stand alone 8088 processor
with (yup you guessed it) a 27c512 to hold the x.25 firmware. Sigh....

On the brighter side, I spoke with Utilicom Inc. today and they have
subcontracted a true multipoint to multipoint firmware development.
They tell me it's due to be added to their product line in October or
later this year.

Their "Long Ranger" modem already has some interesting features including
software selectable power output and selectable DS P/N codes, and
CSMA/Collision Avoidance for efficient collision-free operation in systems
containing multiple transceivers operating at the same RF frequency and with
the same P/N code.

As an alternative, pairs of transceivers can be programmed to use different
RF channels and P/N codes, allowing simultaneous operation without
reduction of data throughput.

This to me is the meat and potato of control over the modem and critical toward
future standardization. Certainly not something that is hard coded in firmware
and tossed aside to fit a pretty (but useless) software option.

While Utilicom modems only go to about 64Kb I still applaud them for
their firmware engineering and they are working on a T1 or higher speed
modem for their product line.

They also said that some changes relaxing FCC antenna regulations
for part 15 wireless devices may be in the works soon.

31. New (?) chipset?

From: Dirk-Jan Koopman <djk@tobit.co.uk>
Date: Wed, 7 Aug 1996 19:48:28 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.93.960807194700.487A-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

Check out the Z87200 part on Zilog's web site (http://www.zilog.com/) I
ask for prices $36 for slow part $50 for the fast part.

Dirk

32. Network point to multipoint

From: Kleber Almeida <kleber@magiclink.com.br>
Date: Fri, 09 Aug 1996 00:11:11 -0700
To: ss@tapr.org
Message-ID: <320AE48F.1EDC@magiclink.com.br>
Rendered body type: text/plain

Hi !!!

        Where i find informations about building a Metropolitan Area Network (MAN)
using wireless tecnology (specialy spread spectrum radio/modems) at high speed
(up 33 kbps or more) with access for internet, roaming, etc. ?

33. RE: [SS:489] Network point to multipoint

From: TJ OBRIEN <0007367829@mcimail.com>
Date: Fri, 9 Aug 96 05:24 EST
To: ss <ss@tapr.org>
Message-ID: <80960809102408/0007367829PJ2EM@MCIMAIL.COM>
Rendered body type: text/plain

You ca start with <Local and Metropolitan
Area Networks by W. Stallings , Fourth
Edition, IBSN 0-02-415465-2
73

tj
K2CPF
Alternate address <tjob@erols.com>

34. Re: [SS:490] RE: Network point to multipoint

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Fri, 9 Aug 1996 09:37:25 -0400 (EDT)
To: TJ OBRIEN <0007367829@mcimail.com>
Cc: kleber@magilink.com.br, ss@tapr.org
Message-ID: <Pine.BSI.3.91.960809093114.2361A-100000@zeus>
Rendered body type: text/plain

On Fri, 9 Aug 1996, TJ OBRIEN wrote:

> You ca start with <Local and Metropolitan
> Area Networks by W. Stallings , Fourth
> Edition, IBSN 0-02-415465-2
> 73
> tj
> K2CPF
> Alternate address <tjob@erols.com>
>

Hi:

You've got to be kidding! We used this book in a local area networks course and we all (instructor included) found it to be poorly written. Furthermore, Stallings doesn't know much (anything?) about wireless networking.

Kleber is clearly looking for a book on wireless network. How about those books that Steve Bible recommended several months ago as "required reading" for wireless networking? I'll try to dig his old message out if I still have it.

73

Bernie nu1s

35. Re: [SS:486] Re: Wireless Firmware

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sat, 10 Aug 1996 02:37:59 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199608100237.CAA23754@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Bob said:
>   (c) FreeWave receivers, by virture of their lower channel bandwidth,
> are significantly more sensitive than the WaveLAN. The FreeWave's I've
> measured operate in the range of -100 to -107 dBm, whereas the WaveLAN
> is specificied at -78 dBm (not yet measured).
>
> Jeff--
>
> since you have working systems, might you publish some user-level
> (say, FTP) throughputs, contrasting both systems using an apples-to-apples
> benchmark? I'm sure everyone would find this information useful.

I haven't had time to try the WaveLAN cards yet, but I'm currently looking at some Proxim RangeLAN2 units (2.4 GHz FH)... not surprisingly, they're in the same ballpark as WaveLAN as far as receiver sensitivity goes. According to my measurements, the BER hits 10E-6 at about -80 dBm (which is the same figure given in Lucent's specs for "receiver sensitivity" of 2.4 GHz WaveLANs). At this signal level, the RangeLANs are in the fallback BFSK mode at 0.8 Mbps. It takes another 10 dB or so for the 4FSK 1.6 Mbps mode to kick in.

FTP throughput was measured between two 486s running JNOS (TCP MSS = 1460)... it averaged 42.3 Kbytes/s at -80 dBm and 67.3 Kbytes/s at -70 dBm. Throughput topped out at just over 70 Kbytes/s. This is not too shabby (about 20 times what we get on our 56 Kbps MAN!), but clearly there is quite a bit of overhead in Proxim's MAC layer implementation... apparently their RangeLink product, based on the same hardware, is more optimized for point-to-point and has higher throughput.

I hope to get some field tests done this weekend.

Barry

```
--
  Barry McLarnon  VE3JF/VA3TCP   |  Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club      |  AMPRnet:  bm@lynx.ve3jf.ampr.org
  Packet Working Group           |  Web:      http://hydra.carleton.ca
```

36. Re: [SS:492] Re: Wireless Firmware

From: Carol AByers <crlbyers@garlic.com>
Date: Sun, 11 Aug 1996 14:02:45 -0700
To: ss@tapr.org
Cc: crlbyers@garlic.com
Message-ID: <320E4A75.5E59@garlic.com>
Rendered body type: text/plain

Barry McLarnon VE3JF wrote:

> Bob said:
> > (c) FreeWave receivers, by virture of their lower channel bandwidth,
> > are significantly more sensitive than the WaveLAN. The FreeWave's I've
> > measured operate in the range of -100 to -107 dBm, whereas the WaveLAN
> > is specificied at -78 dBm (not yet measured).
> >
> > Jeff--
> >
> > since you have working systems, might you publish some user-level
> > (say, FTP) throughputs, contrasting both systems using an apples-to-apples
> > benchmark? I'm sure everyone would find this information useful.
>
> I haven't had time to try the WaveLAN cards yet, but I'm currently
> looking at some Proxim RangeLAN2 units (2.4 GHz FH)... not surprisingly,
> they're in the same ballpark as WaveLAN as far as receiver sensitivity
> goes. According to my measurements, the BER hits 10E-6 at about -80
> dBm (which is the same figure given in Lucent's specs for "receiver
> sensitivity" of 2.4 GHz WaveLANs). At this signal level, the RangeLANs
> are in the fallback BFSK mode at 0.8 Mbps. It takes another 10 dB or so
> for the 4FSK 1.6 Mbps mode to kick in.
>
> FTP throughput was measured between two 486s running JNOS (TCP MSS =
> 1460)... it averaged 42.3 Kbytes/s at -80 dBm and 67.3 Kbytes/s at -70
> dBm. Throughput topped out at just over 70 Kbytes/s. This is not too
> shabby (about 20 times what we get on our 56 Kbps MAN!), but clearly
> there is quite a bit of overhead in Proxim's MAC layer implementation...
> apparently their RangeLink product, based on the same hardware, is more
> optimized for point-to-point and has higher throughput.
>
> I hope to get some field tests done this weekend.
>
> Barry
>
> --
>   Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
>   Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
>   Packet Working Group | Web: http://hydra.carleton.caHi Barry,

Have been working with these unit at work, and would link to know how you
are testing...i.e., test equipment, software, test procedures, etc.

Would also, like to set up an amateur radio network too... any help would
be greatly appreciated.

73's, de Carol W9HGI

37. Spread Sprectrum Transceivers

From: Carol AByers <crlbyers@garlic.com>
Date: Fri, 16 Aug 1996 19:44:22 -0700
To: ss@tapr.org
Cc: crlbyers@garlic.com
Message-ID: <32153206.3427@garlic.com>
Rendered body type: text/plain

Would like to either build or buy a SS XCVR. Am not sure where to start.
Can anyone offer help? Are there any kits, plans, etc. ?

TNX,

Carol, W9HGI

38. Re: Spread Sprectrum Transceivers

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Fri, 16 Aug 1996 11:00:40 -0400
To: ss@tapr.org
Message-ID: <2.2.32.19960816150040.00748140@mindspring.com>
Rendered body type: text/plain

In [SS:494] Carol, W9HGI wrote:
>Would like to either build or buy a SS XCVR. Am not sure where to start.
>Can anyone offer help? Are there any kits, plans, etc. ?
>
>TNX,
>
>Carol, W9HGI
>
For commercial and OEM devices, and links to chip makers, take a look at my web page http://www.mindspring.com/~lfry/part15.htm - Not everything I have found is there yet, but I am updating it every couple of days or so. Check back & reload.

As previous postings have pointed out, you can operate approved devices under part 15, or if you want to experiment (with non-approved antennas, power levels etc.) you will have to join Buass' STA - see http://www.tapr.org/ss/.

Lee - AA0JP
lfry@mindspring.com

39. More on threats to amateur radio spectrum with SS

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Sat, 17 Aug 1996 08:15:12 -0700
To: ss@tapr.org (TAPR SS Mailing List),
        fccreg@tapr.org (TAPR FCC Regulatory List)
Message-ID: <v0300784aae3b903e125b@[204.118.182.22]>
Rendered body type: text/plain

A couple of weeks ago I made a posting to this list about the current threats to amateur radio spectrum in the UHF and microwave bands. One of the things that I pointed out was that various commercial companies were making use of SS technology in order to build a case to the FCC that they could co-exist without interferrence with the incumbants in the band. One company that I mentioned was DSC Communications, which has submitted a petition for rulemaking to the FCC to obtain spectrum in our 2.4 GHz band.
        I thought that members of this list would be interested in seeing a followup in the form of a bulletin that Brad Wyatt K6WR, the ARRL Pacific Division Director just put out this morning on this issue. As you can see, at least someone in the ARRL infrastructure is working on this problem.

-- Dewayne

==========

Latest news as of 7AM PDT, Aug. 17, 1996, on another 2400 Mhz. potential reallocation and related matters --

To those of you on the Pacific Division 2400 MHz Alert List --- This bulletin and the rest of the information should also be found on the ARRL Pacific Division Home Page on WWW at pdarrl.org ---

Latest news --

Dewayne Hendricks, WA8DZP, sent me a very interesting story involving yet another company now selling a wireless local loop product using spread spectrum technology in the unlicensed Part 15 bands!!!!

As Dewayne puts it, "So here we are, the DSC WLL petition isn't even cold yet and we have another company shipping a SS WLL product that operates in the ham radio spectrum allocation."

Here is the story ---

Tadiran delivers first wireless local loop system in U.S.

Source: Business Wire

CLEARWATER, Fla.--(BUSINESS WIRE) via Individual Inc. -- Tadiran Telecommunications Ltd. (NASDAQ: TTELF) today announced MultiGain

Wireless (MGW), the first wireless local loop system to be made available in the United States.

Tadiran's new wireless system delivers all the basic and enhanced voice and data services of today's wired POTS network with none of the costs for maintenance of copper or fiber optic connections. Installation of the entire MultiGain Wireless system into a neighborhood can be accomplished in a few days.

Tadiran's MultiGain Wireless local loop system provides local and long distance carriers, Regional Bell Operating Companies (RBOCs) and Competitive Access Providers (CAPS), with a state-of-the-art, cost-effective telecommunications alternative to conventional copper plants. The MGW delivers an exceptionally clear and secure wireless telephone service that can be installed practically anywhere from new housing developments, where no current copper infrastructure is present, to remote communities, where cable would be impossible or extremely expensive to install. In addition, since there are no physical transmission lines to the subscriber, interruption of service due to cable failure is nearly impossible.

"Since copper connectivity is not needed, Tadiran's MultiGain Wireless is the perfect communications solution in areas throughout the U.S. where the existing feeder or distribution cables are fully loaded, of questionable quality, or where the repair of faults in existing cable is simply impractical," said Mark Vida, Vice President and General Manager of Tadiran Telecommunications Network Systems in Clearwater, Florida. "MGW is also an ideal solution for applications that require quick, but temporary installations -- such as providing service during major public events or natural disasters, where it is not feasible to lay copper cables."

Spread Spectrum Frequency Hopping

Through the use of Tadiran's spread spectrum frequency hopping digital radio technology, MGW provides subscribers with the same Toll Quality that they are used to with copper lines and allows for seamless connectivity to all the local switch services they may be currently using -- from POTS to ISDN. By constantly switching frequencies within its operating band, the MGW avoids interference to a subscriber's call. In addition, the MGW Radio Port Unit may use either omnidirectional or sectorized antennas, allowing for flexible radio coverage and optimal deployment. The use of the unlicensed ISM frequency band saves the operator the need to pay for costly frequency allocation.

Subscriber Benefits

Tadiran's MultiGain Wireless system provides subscribers with:

- Toll Quality voice, data, facsimile, modem, BR-ISDN, CLASS and CENTREX communications not available with cellular service;

- Complete, seamless connectivity with all current communications from POTS to ISDN;

- An extremely cost-effective wireless access solution;

- Secure communications through its frequency hopping features; and

- Easy and quick installation and maintenance, minimizing subscriber downtime.

MultiGain Wireless Architecture

Three basic units are used to bring wireless local loop telephone service to the subscriber.

1. The Radio Port Control Unit (RPCU) is the interface between the central office and the Radio Port Units. It may operate over digital lines or be combined with the Analog Interface Unit (AIU) to provide the interface over analog lines.

2. The Radio Port Unit (RPU) provides the radio links between the local switch and the Fixed Access Unit located at the subscriber's home or business.

3. The Fixed Access Unit (FAU) is installed at the subscriber's location and completes the wireless radio link to the RPU. The FAU also provides a standard wired interface to each customer for a variety of

equipment, such as telephone, facsimile, or modem. These wired devices
can then send information - voice or data - over the wireless system.

Customer Record

The MGW system is operating successfully in numerous countries around
the world. Domestic trials are currently being performed with U.S.
West, and other selected customers in the United States.

Pricing and Availability

The Tadiran MultiGain Wireless system is available and is priced between
$500 to $1,500 per line, depending on the number of subscribers and the
terrain of the given installation.

Tadiran Telecommunications, Ltd. (NASDAQ: TTELF) designs, develops,
manufactures and markets a wide range of sophisticated wired and
wireless telecommunications equipment, such as Wireless Local Loop
products, Digital Cross-Connect systems, Digital Pair Gain systems,
Multiplexers, ADPCM transcoders, PBX and Key systems, ACD systems,
Computer Telephony Integration, and Wireless PBX. Tadiran
Telecommunications, Ltd. is a subsidiary of Tadiran Ltd. (NYSE:TAD).

T::DAX is a trademark of Tadiran Telecommunications, Ltd.

CONTACT: Tom O'Boyle | Tadiran Telecommunications, Inc. | Tadiran
Electronic Industries, Inc. | (813) 523-0000 | or | Jack Varley/Peter
Gorman | Copithorne & Bellows | (617) 450-4300 | peterg@ca.cbpr.com

[08-15-96 at 08:47 EDT, Business Wire]

NOTE: The Reply Comment Date on RM 8837 is Tuesday, Aug. 27.

Thanks to Dewayne Hendricks, WA8DZP, Assistant Director, Pacific
Division for this information.

We will need all those interested in retaining 2390-2450 MHz to develop
Reply Comments by the deadline date of Tuesday, Aug. 27.

More details will be sent to the Pacific Division 2400 MHz Alert List
and posted on the Pacific Division Home Page as soon as they are known.

Contact Brad Wyatt, K6WR, Pacific Division Director at k6wr@arrl.org or
(408) 395-2501 if you can help in any way.

73, Brad Wyatt K6WR ARRL Pacific Division Director

40. Re: [SS:494] Spread Sprectrum Transceivers

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Sat, 17 Aug 1996 12:58:02 -0400
To: ss@tapr.org
Message-ID: <215FAC20.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

Carol,

     Some of us are working on just such a thing. No one makes a DSSS xcvr
     for amateur radio use, to the best of my knowledge.

     I am working on a basic SS radio and I hope to have it computer
     controlled as well. I am going to make it modular; I want to use
     different plug-in modules for the various ham bands.

     Check out the Spread Spectrum Sourcebook from ARRL. It is a good
     start.

     73 de Tony, KE4ATO

_____________________________ Reply Separator _____________________________
Subject: [SS:494] Spread Sprectrum Transceivers
Author: ss@tapr.org at BALT.SMTP
Date: 8/15/96 11:38 PM

Would like to either build or buy a SS XCVR. Am not sure where to start.
Can anyone offer help? Are there any kits, plans, etc. ?

TNX,

Carol, W9HGI

41. Re: [SS:497] Re: Spread Sprectrum Transceivers

From: Dirk-Jan Koopman <djk@tobit.co.uk>
Date: Sat, 17 Aug 1996 18:33:49 +0100 (BST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.93.960817183008.22404M-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Sat, 17 Aug 1996, LANIER.R.A- wrote:

> Carol,
>
> Some of us are working on just such a thing. No one makes a DSSS xcvr
> for amateur radio use, to the best of my knowledge.
>
> I am working on a basic SS radio and I hope to have it computer
> controlled as well. I am going to make it modular; I want to use
> different plug-in modules for the various ham bands.
>
> Check out the Spread Spectrum Sourcebook from ARRL. It is a good
> start.
>
> 73 de Tony, KE4ATO
>

I don't know whether anybody noticed but Zilog make a complete SS modem
for $36 (20Mhz) and $50 (40Mhz) which essentially requires an RF frontend
and some TX hardware - all the 'hard' part appears to be done on chip. It
is called a Z87200 and can be viewed (with a PDF aware Browser) on
www.zilog.com.

Does this interest anybody other than me?

Dirk

--
Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

42. Re: [SS:498] Re: Spread Sprectrum Transceivers

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Mon, 19 Aug 1996 09:52:09 -0400
To: ss@tapr.org
Message-ID: <21872390.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

A few companies are coming out with SS chip sets; I haven't heard of
     the one from Zilog. I chechk out there web site today.

     I still haven't come across a SS xcvr kit...yet, but I'm working on
     it. Actually, I am working on a "simple" version and a more complex,
     PC-based version.

     73s de Tony, KE4ATO

_____ Reply Separator _____
Subject: [SS:498] Re: Spread Sprectrum Transceivers
Author: ss@tapr.org at BALT.SMTP
Date: 8/17/96 12:50 PM

I don't know whether anybody noticed but Zilog make a complete SS modem
for $36 (20Mhz) and $50 (40Mhz) which essentially requires an RF frontend
and some TX hardware - all the 'hard' part appears to be done on chip. It
is called a Z87200 and can be viewed (with a PDF aware Browser) on
www.zilog.com.

Does this interest anybody other than me?

Dirk

```
--
Dirk-Jan Koopman       Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant    Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde
```

43. Re: [SS:497] Re: Spread Sprectrum Transceivers

```
From: Carol Byers <crlbyers@garlic.com>
Date: Mon, 19 Aug 1996 15:15:04 -0700
To: ss@tapr.org
Cc: crlbyers@garlic.com
Message-ID: <3218E768.6C35@garlic.com>
Rendered body type: text/plain
```

```
LANIER.R.A- wrote:
>
>      Carol,
>
>      Some of us are working on just such a thing. No one makes a DSSS xcvr
>      for amateur radio use, to the best of my knowledge.
>
>      I am working on a basic SS radio and I hope to have it computer
>      controlled as well. I am going to make it modular; I want to use
>      different plug-in modules for the various ham bands.
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>      Check out the Spread Spectrum Sourcebook from ARRL. It is a good
>      start.
>
>      73 de Tony,  KE4ATO
>
> _________________________________ Reply Separator _________________________________
> Subject: [SS:494] Spread Sprectrum Transceivers
> Author:  ss@tapr.org at BALT.SMTP
> Date:    8/15/96 11:38 PM
>
> Would like to either build or buy a SS XCVR.  Am not sure where to start.
> Can anyone offer help?  Are there any kits, plans, etc. ?
>
> TNX,
>
> Carol, W9HGI
> Hi Tony,

Will get a copy of the book.

Sounds like a great project ... how far have you gotten ?  What IC are
you using ?  When will you have it up and running ??

Carol
```

44. Re: [SS:498] Re: Spread Sprectrum Transceivers

```
From: Carol Byers <crlbyers@garlic.com>
Date: Mon, 19 Aug 1996 15:17:08 -0700
To: ss@tapr.org
Cc: crlbyers@garlic.com
Message-ID: <3218E7E4.4F3@garlic.com>
Rendered body type: text/plain
```

```
Dirk-Jan Koopman wrote:
>
> On Sat, 17 Aug 1996, LANIER.R.A- wrote:
>
> >      Carol,
> >
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> >      for amateur radio use, to the best of my knowledge.
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> >      I am working on a basic SS radio and I hope to have it computer
> >      controlled as well. I am going to make it modular; I want to use
> >      different plug-in modules for the various ham bands.
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> >      start.
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> >      73 de Tony,  KE4ATO
> >
>
> I don't know whether anybody noticed but Zilog make a complete SS modem
```

> for $36 (20Mhz) and $50 (40Mhz) which essentially requires an RF frontend
> and some TX hardware - all the 'hard' part appears to be done on chip. It
> is called a Z87200 and can be viewed (with a PDF aware Browser) on
> www.zilog.com.
>
> Does this interest anybody other than me?
>
> Dirk
>
> --
> Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
> Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
> "The typewriting machine, when played with expression, is no more annoying than
> the piano when played by a sister or near relation." --Oscar WildeThanks for the information...I'm off
 to check it out...

Carol

45. SS and public service

From: "\"Jeffrey D. Spears\"" <jef@novagate.com>
Date: Fri, 23 Aug 1996 20:39:46 -0500 (GMT-0500)
To: ss@tapr.org
Message-ID: <199608240139.AA04815@novagate.com>
Rendered body type: text/plain

Greetings all;

        Although I am not at the level of typical discussions that flow
through this SIG, am tremendously interested, and working toward EE
degree. I have a suggestion for you all, and will depend on you all to
make a determination as to whether or not it has merit.

        I was driving down the freeway the other day thinking how nice it
would be to have local NWS product in text format available to me in
the car. What I dreamed of was a little box which could be stuck to
the dashboard with an LCD display. This display would, when within
range of a transmitting site, allow the user to scroll through the NWS
text.

        Somewhere in part 97 there is a clause that says that we cannot
"broadcast" things such as weather. I believe this is a very weak
clause, and that it could easily be changed.

        Now, being a Coast Guard Radioman (they call us Telecommunications
Specialist (TC) now), I have experience working with the US Navy's
TDMA/DAMA system. It seems to me that SS would work nicely for a
system similiar to this. I see a flexible system where different data modes
could be stacked upon each other in a TDM format, using SS as the
'link level?'. Users of such a system would be asked to have NWS product
available on the first--or lowest--level of the TDM transmissions. This
could become a standard. Then, users could customize the rest of the
TDM space with other services such as digital voice, packet radio,
whatever.

        Imagine if every ax.25 node had this sort of service available.
A driver motoring down the expressway might come into contact with a
transmitting site every hour or so depending on the area being
travelled through.

        Make the reciever design for such a thing public domain. If there
were wide enough demand, and good enough coverage, than the thing
would become a viable product for Rip-Off Shack to market. I would pay
$100 for such a thing--wouldn't you?

        What say you?

        ciao...jef (N8LZE)

46. Re: [SS:500] Re: Spread Sprectrum Transceivers

From: LANIER.R.A-@smtpgty.bwi.wec.com (LANIER.R.A-)
Date: Fri, 23 Aug 1996 12:29:50 -0400
To: ss@tapr.org
Message-ID: <222F2CC0.1858@smtpgty.bwi.wec.com>
Rendered body type: text/plain

I'll have it up and running as soon as I can find a suitable chip set.
     Alot of them are very expensive right now, but as soon as production
     kicks in, they will get cheaper.

My intention is to have a radio that most hams can build. The modular
RF portion is borrowed from a QRP radio project in the '96 Handbook.

I will let you know how things progress.

Tony

_____ Reply Separator _____
Subject: [SS:500] Re: Spread Sprectrum Transceivers
Author: ss@tapr.org at BALT.SMTP
Date: 8/19/96 5:40 PM

LANIER.R.A- wrote:
>
> Carol,
>
> Some of us are working on just such a thing. No one makes a DSSS xcvr
> for amateur radio use, to the best of my knowledge.
>
> I am working on a basic SS radio and I hope to have it computer
> controlled as well. I am going to make it modular; I want to use
> different plug-in modules for the various ham bands.
>
> Check out the Spread Spectrum Sourcebook from ARRL. It is a good
> start.
>
> 73 de Tony, KE4ATO
>

Will get a copy of the book.

Sounds like a great project ... how far have you gotten ? What IC are
you using ? When will you have it up and running ??

Carol

September 1996

Original source file: ss.9609
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9609

1. Anybody out there?

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Mon, 02 Sep 1996 17:31:58 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960902213158.00696fa0@gnatnet.net>
Rendered body type: text/plain

Having been away for the past several months, I have resubscribed to the
ss-sig. But in the last few days I have seen nothing! I am wondering if
the listserver is still working.

Anyone planning on attending the DCC in Seattle? I have 45 minutes to
introduce the topic of SS. Curious if readers of this list would like to
suggest some topics to cover and common questions to be answered.

73,

 - Steve, N7HPR

srbible@gnatnet.net
n7hpr@amsat.org
n7hpr@tapr.org

2. Re: Anybody out there?

From: Rick Whiting <rwhiting@winternet.com>
Date: Mon, 2 Sep 1996 18:27:06 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199609022327.SAA10602@icicle.winternet.com>
Rendered body type: text/plain

At 17:46 9/2/96 -0500, Steven R. Bible" <srbible@gnatnet.net wrote:
>Anyone planning on attending the DCC in Seattle? I have 45 minutes to
>introduce the topic of SS. Curious if readers of this list would like to
>suggest some topics to cover and common questions to be answered.

Well, there is the "issue" well discussed here and on other mail lists of
the compatibility of SS with other modes. I'm sure the question will come up
so might as well hit it in your talk.

Regards/ Rick

  Richard A. (Rick) Whiting   Phone: + 1 612 550 1213
  5780 Rosewood Ln. N.   E-mail: rwhiting@winternet.com
  Plymouth, MN 55442-1411   Packet: W0TN @ WB0GDB.MN.USA.NOAM
   INDEPENDENT PROFESSIONAL CONSULTANT - TELECOMMUNICATIONS & WIRELESS
 ----

3. Re: [SS:505] Re: Anybody out there?

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Mon, 02 Sep 1996 21:04:04 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960903010404.00663734@gnatnet.net>
Rendered body type: text/plain

At 17:46 9/2/96 -0500, Steven R. Bible" <srbible@gnatnet.net wrote:
>>Anyone planning on attending the DCC in Seattle? I have 45 minutes to
>>introduce the topic of SS. Curious if readers of this list would like to
>>suggest some topics to cover and common questions to be answered.

At 06:39 PM 9/2/96 -0500, And Rick saz:
>Well, there is the "issue" well discussed here and on other mail lists of
>the compatibility of SS with other modes. I'm sure the question will come up
>so might as well hit it in your talk.

No doubt Rick, and this is the most difficult one to discuss intellegently
and calmly (based on past experience :-).

This begs the question of how do we address this "issue." Me thinks it's
one of two ways: 1) theoritically or 2) in practice.

Theoritically speaking, there are several papers written on the subject, and
not all of them agree as to the amount of spectrum sharing one can have with

incumbant users. Some papers say none and others say some. It all depends
on your point of view and what mathematical model you use.

The second method is the one I wish amateurs would imbrace, that of going
out there and experimenting and seeing first hand how the two systems behave
(empirical testing). I only hope this doesn't result in a "range war"
between spread spectrum users and others. So it seems to boil down to how
do we cooperate to learn of the compatibility issue and the limits there are
in overlaying spread spectrum with incumbant users.

 - Steve, N7HPR

srbible@gnatnet.net
n7hpr@amsat.org
n7hpr@tapr.org

4. Re: Steve's Talk

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 3 Sep 1996 01:36:51 -0500 (CDT)
To: ss@tapr.org (Spread Spectrum)
Message-ID: <199609030636.BAA07917@tapr.org>
Rendered body type: text/plain

Actually Steve, I don't think you really need to spend much time on the
issue of co-existence. At least not a unproporitional amount as compared
to other points. It should probably be a slide or maybe two.

As with the talk you listened to that Tom and myself gave at HamCom -- we
discussed it, but didn't spend lots of time on ot - since there are a lot of
things to cover in 45 mins. It came up as we talked about other items in
the technical area...like PSD and spreading codes and power....like weaving
a picture and covering it as we went -- since there is more than on topic
involved to make a case to why there shouldn't be a problem.

I think we hit on this when we talked on the phone the other night. Much of
the case requires at least a basic understanding of the basics. That is why
I think your book will be a better place to devote a chapter to on the issue
of co-existance than in a 45 min talk.

After doing a talk now 4 times on SS, I find that most people are interested
and concerns on specific issues are discussed after the presenation in
the hall.

I haven't been to another meeting like the one we had at Long Beach that the
ARRL hosted last year.   That meeting thus far seems to have been an
anomoly.

Anywya -- that my .02 cents worth.

Greg

5. Re: [SS:504] Anybody out there?

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Tue, 3 Sep 1996 06:58:13 -0800 (PDT)
To: ss@tapr.org (Steven R. Bible)
Message-ID: <199609031358.AA265669093@hpsadr2.sr.hp.com>
Rendered body type: text/plain

>
> Having been away for the past several months, I have resubscribed to the
> ss-sig. But in the last few days I have seen nothing! I am wondering if
> the listserver is still working.

Steve,

Perhaps we were all waiting for you to return (:>) It *has* been pretty
quiet. I think it's the end of summer doldrums.

>
> Anyone planning on attending the DCC in Seattle? I have 45 minutes to
> introduce the topic of SS. Curious if readers of this list would like to
> suggest some topics to cover and common questions to be answered.

Yes, I'm planning on attending. Had you planned or do you know of any
hardware demonstrations? Watching a correlator acquire on a spectrum

analyzer is no doubt worth a thousand words.... I don't have a very good
feel for what people are/would be   interested in.

Glad to see you back.

Glenn n6gn

6. Re: [SS:508] Re: Anybody out there?

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Tue, 03 Sep 1996 17:10:45 -0400
To: ss@tapr.org
Message-ID: <1.5.4.32.19960903211045.00690194@gnatnet.net>
Rendered body type: text/plain

At 09:01 AM 9/3/96 -0500, Glenn n6gn wrote:

>Yes, I'm planning on attending. Had you planned or do you know of any
>hardware demonstrations? Watching a correlator acquire on a spectrum
>analyzer is no doubt worth a thousand words.... I don't have a very good
>feel for what people are/would be   interested in.

This would be a good demonstration offline from the talk, perhaps, given
that I have only 45 minutes worth of time. I have also attended SS demos
that included two units talking to one another and a spectrum analyzer
showing the spectrum. I am not sure how the audience received it. Then
again, it was a "general" audience. The DCC would be a more focused group.
I am always on the look out for meaningful demonstrations/examples/exhibits
that show how spread spectrum works. Granted, now that I have studied the
concepts, there's no mystery; but now to convey this to everyone else :-).

Since the attendees of the DCC are a more advanced group, then a more
advanced talk might be in order. I don't intend on spending much time on
"spread spectrum isn't new" and "Shannon suggested..." sorts of retoric. I
plan on starting with topics people are familiar with and progress toward
SS. The idea is the classic teaching method of assimilating new knowledge
with old knowledge (or rather knowledge one is familiar with).

So here's the plan, start with PSK modulation and show how BPSK and QPSK
multipied by a PN sequence becomes DSSS. Then spend some time on the issues
of correlation, synchronization and tracking. Of course cover FH, which is
not as hard a concept to get across. I'd also like to extol the virtues of
SS and how they relate to networking.

>Glad to see you back.

Thanks! Glad to be back.

73,

 - Steve, N7HPR

srbible@gnatnet.net
n7hpr@amsat.org
n7hpr@tapr.org

7. Correlators

From: Steve Sampson <ssampson@oklahoma.net>
Date: Tue, 03 Sep 1996 17:23:03 -0500
To: ss@tapr.org
Message-ID: <322CAFC7.256C626F@oklahoma.net>
Rendered body type: text/plain

Way back when TRW produced the FFT on a chip, I ordered one of
their spec books. Looking through it I found the correlator
chip. Back in those days I was mostly into speech scramblers
and TDMA, but the thought comes to mind how easy these must be
to produce using a PAL, GAL, or whatever the current product
is called. Probably a speed limit for these things, but they
probably could fill a vacuum. You don't see correlator chips
for sale in the Jameco catalog :-)

Who sells these things today?

Steve

8. (no subject)

From: arutz@shfmicro.com (alan rutz)
Date: Tue, 3 Sep 1996 17:57:12 -0500
To: ss@tapr.org
Message-ID: <199609032257.RAA07059@alice.adsnet.com>
Rendered body type: text/plain

I want to build a PN generator.

I am aware of Randy Roberts KC6YJY article in 73 magazine, Nov 92, that
shows a good 7-stage PN generator, and I am aware of Randy's schematic in
SSS Jun 92 showing a PN generator capable of 33 different Gold codes.

Anyone have anything newer/better/cheaper?

Alan, WA9GKA

9. Re: [SS:511]

From: bruce@satscan.com
Date: Wed, 4 Sep 1996 06:21:38 -0700
To: ss@tapr.org
Message-ID: <199609041321.GAA04676@satscan.com>
Rendered body type: text/plain

> I am aware of Randy's schematic in
>SSS Jun 92 showing a PN generator capable of 33 different Gold codes.
>
>
>Alan, WA9GKA
>
>
Whats SSS? Where can I get a copy? Who publish's that publication?

TNX Bruce KF7PJ
Bruce Weber, KF7PJ, Satscan Corporation / Cascade Technology
PO Box 1109, Sultan WA 98294-1109 (360)-793-3433 FAX: 793-0359

10. Re: [SS:512] Re:

From: arutz@shfmicro.com (alan rutz)
Date: Wed, 4 Sep 1996 11:29:30 -0500
To: ss@tapr.org
Message-ID: <199609041629.LAA18604@alice.adsnet.com>
Rendered body type: text/plain

>> I am aware of Randy's schematic in
>>SSS Jun 92 showing a PN generator capable of 33 different Gold codes.
>>Alan, WA9GKA

>Whats SSS? Where can I get a copy? Who publish's that publication?
>
>TNX Bruce KF7PJ

SSS (Spread Spectrum Scene Magazine) started (I think) in 1992 by Randy
Roberts, KC6YJY. Like many specialty magazines, it had to change format a
couple of times, and now is published "on-line" at
http://www.sss-mag.com/whatsnew/

While he sent out a printed magazine to subscribers, (I subscribed early and
often!) he also contributed to a few Ham magazines, and Randy is very much
involved in Spread-spectrum.

Randy's mailing address is PO Box 2199, El Granada, CA, 94018-2199, and his
E-mail address is randyrf@sss-mag.com (may by outdated?)

Besides Randy's two scematics for making a pseudorandom number generator,
does anyone else have anything newer, or cheaper, or maybe even better?

Alan, WA9GKA
SHF Microwave Parts Co.   (http://www.shfmicro.com) (arutz@shfmicro.com)

11. TAPR SS Position Statement

From: Greg Jones <wd5ivd@tapr.org>
Date: Tue, 24 Sep 1996 02:13:44 -0500 (CDT)
To: ss@tapr.org (Spread Spectrum), tapr-bb@tapr.org (TAPR-BB mailing)
Message-ID: <199609240713.CAA24566@tapr.org>
Rendered body type: text/plain

This will be published in the upcoming PSR. It was passed at the Board
meeting held last Friday.

Cheers - Greg

TAPR's Statement on Spread Spectrum Technology Development

TAPR was founded in 1982 as a membership supported non-profit amateur radio research and development organization with specific interests in the areas of packet and digital communications. In the tradition of TAPR, the Board of Directors at their Fall 1995 meeting voted that the organization would begin to actively pursue the research and development of amateur radio spread spectrum digital communications. At the Spring 1996 board of directors meeting, the following statement of purpose was passed:

"TAPR believes that the technical facts support our conviction that conventional and spread spectrum systems can coexist without detriment to conventional systems on all frequencies from MF to EHF. To this end, TAPR will begin to research spread spectrum systems that will develop technology for future deployment."

As stated above, the TAPR board feels strongly about TAPR's focus on spread spectrum technology and especially how it relates to the potential coexistence on frequencies that will have increased number of users occupying them. The amateur radio bands, like other spectrum will become more heavily utilized in the future. It is in the interest of amateur radio to develop systems that are interference-resistant while not interfering with other primary or secondary users on those frequencies.

TAPR understands the concerns many have with the new technology, and believes that efforts in both education and research is necessary in order to allay the fears about interference and to demonstrate the benefits of the technology.

TAPR believes that todays' communications technology is moving toward all digital transmitters and receivers. These advances in technology, combined with the swift evolution of cell based transmission and switching protocols, are opening up a new set of possibilities for unique new services utilizing intelligent networks. These will contain smart transmitters, receivers, and switches. Today's Internet is perhaps the best example of a self-regulating structure that embodies these new technological approaches to communications in the networking domain. However, to date, many of these innovations have not moved into the wireless networking arena. TAPR will work on moving these innovations into the amateur radio community.

TAPR feels that the VHF/UHF/SHF radio networks of the future will involve a mixture of links and switches of different ownership, which terminate at the end-user via relatively short-distance links. What will then be required is a built-in, distributed, self-governing set of protocols to cause the network's behavior to make more efficient use of a limited, common shared resource, the radio spectrum. Creating such a self-regulating structure for the optimal sharing of spectrum will require much effort.

One of the major problems which stands in the way of these new approaches today is the current FCC regulatory environment and the manner in which spectrum is managed and allocated under its rules.

Historically, the current regulatory approach to radio has been based upon the technology that was in use at the time that the Communications Act of 1934 was framed, basically what we would call today, 'dumb' transmitters speaking to 'dumb' receivers. The technology of that time required reserved bandwidths to be set aside for each licensed service so that spectrum would be available when needed. Given this regulatory approach, many new applications cannot be accommodated since there is no available unallocated spectrum to 'park' new services. However, given the new set of tools available to the entrepreneur with the advent of digital technology, what once were 'dumb' transmitters and receivers can now be smart devices which are capable of exercising greater judgment in the effective use and sharing of spectrum. The more flexible the tools that we incorporate in these devices, the greater the number of uses that can be accommodated in a fixed, shared spectrum.

Therefore, TAPR will focus its spread spectrum effort in the following areas:

TAPR will work to promote rules and technologies to make the most efficent use of the spectrum through power control, forward error correction, and other means to minimize interference among spread spectrum users and

existing communications systems.

TAPR will work on issues and efforts with other national organizations to change the regulatory environment and rules in order to promote the experimentation, development, and later deployment of spread spectrum technology.

TAPR will work to develop information on the topic to help educate members and the amateur community as a whole about spread spectrum technology, and to disseminate this information via printed publications, the World Wide Web, presentations at conferences and meetings, and other means.

TAPR will work to foster experimentation, development, and design of spread spectrum systems, and to facilitate the exchange of information between the researchers and other interested parties.

TAPR will work to develop a national intra-network to foster the deployment of future high-speed spread spectrum systems into regional and local communities, including the development of suitable protocols and guidelines for deployment of these systems.

TAPR will work with commercial companies who manufacture spread spectrum devices which operate in spectrum shared by the amateur radio service (ARS), in order to make them more aware of the nature of ARS operations on those bands with the goal to work towards the deployment of devices which will minimize interference between all spectrum sharing partners.

TAPR will work with commercial companies who manufacture spread spectrum devices in order to identify equipments that can be either used or modified for use for Part 97 operation.

Adopted by the TAPR Board on September 20th, 1996
at Seatac, Washington Board Meeting.

Spread Spectrum Statement Committee:
Greg Jones, WD5IVD
Dewayne Hendricks, WA8DZP
Barry McLarnon, VE3JF
Steve Bible, N7HPR

October 1996

Original source file: ss.9610
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9610

1. Updated pages

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Thu, 3 Oct 1996 08:51:53 -0800 (PDT)
To: ss@tapr.org
Message-ID: <199610031551.AA093197913@hpsadr2.sr.hp.com>
Rendered body type: text/plain

I've added some updates to my Higher Speed Packet Pages including some
of the notes I presented at the recent DCC as well as some material on
OCARs which I hope may be of interest.

  There is still more to come as I have time.

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|
| |
| http://www.tapr.org/~n6gn/index.html |

2. Useful course?

From: "Bloom, Jon, KE3Z" <jbloom@arrl.org>
Date: Thu, 3 Oct 1996 13:36:00 -0400
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <m0v8qnF-000f5NC@mgate.arrl.org>
Rendered body type: text/plain

This appeared on comp.dsp. I thought it might interest some who could
manage to attend. (Of course, I realize any dyed-in-the-wool Tucsonite
would only attend an ASU course incognito...)

==
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University

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3. Spread Spectrum Chip Sets

From: RLANIER@mailb.harris.com (RLANIER)
Date: Thu, 3 Oct 1996 14:32:20 -0400
To: ss@tapr.org
Message-ID: <25406891@mailb.harris.com>
Rendered body type: text/plain

I have found a good chip set for DSSS use. Its called the PRISM chip
set from Harris Semiconductor. Initially, I thought the price was
excessive, but they are now sampling, so experiments could be done at
low cost. I am getting a set of these and will let everyone know what
I come up with.

73s de
Tony, KE4ATO

---

4. RE: Updated Pages

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 03 Oct 96 13:28:56 UTC
To: ss@tapr.org
Message-ID: <11109@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Glenn,

Interesting stuff on ur updated web page.

Active Repeaters is a fascinating subject. They can be done with a single an-
antenna, and single port amplifiers too. This can lead to a much more economic
package, and greatly reduce the RF connectorisation problems discussed in the
10 Ghz Repeater page. IMPATT, and TUNNEL Diodes have been used as negative
impedance (single port amps, with Reflection Coeficients > 1) amplifiers.

Another way, that is cheap, that gets around the leakage problems, is high
speed phase shifters. It would not be an OCAR (On-Channel Repeater) anylonger,
but, gain could be very much higher. The recieve direction on the coax is fed
into amplifier (for isolation and NF) and then into a 360 degree total phase
shift electronically controlled phase shift bank. The phase shift is run up
at the Channel BW. This translates the incoming signals in the Channel BW,
one channel BW up or down, depending on the direction the phase shifter is run
in. Thus, filter isolation can be added to the directivity and/or antenna
seperation isolation. Oops, the phase shifting rate is run at the channel BW,
not the phase shift.

On the subject of antennas for this. Would it not be great to integrate the
BW filter into the antenna? As one thing. This can be done with Microstrip
antenna technology.

This whole area of discussion really gets wild tho. Like, we could have a
network, where theusers do not even have radios! With a modulated retrore-
flective antenna - amps. As a RF power source scans across each user, his
TNC does not transmit, it modulates a phase shifter between a OCAR like antenna
at his site, and its single port amp. This causes the reflection to be both
at a different frequency, and modulated with his data. Kinda like Aircraft
transponders, only a whole bunch cheaper.

Hell, since the repeater is so cheap, and the radio so expensive, why not
reverse the whole thing?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

---

5. Re: [SS:518] RE: Updated Pages

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Thu, 3 Oct 1996 13:48:21 -0800 (PDT)
To: ss@tapr.org
Message-ID: <199610032048.AA281215702@hpsadr2.sr.hp.com>
Rendered body type: text/plain

> Active Repeaters is a fascinating subject. They can be done with a single an-
> antenna, and single port amplifiers too. This can lead to a much more economic
> package, and greatly reduce the RF connectorisation problems discussed in the
> 10 Ghz Repeater page. IMPATT, and TUNNEL Diodes have been used as negative
> impedance (single port amps, with Reflection Coeficients > 1) amplifiers.

I'm not sure that this is going to be practical at the kind of gains we
probably most often like to run. I doubt that much more than 20 dB of
directivity isolation can be maintained on a single antenna.

> Another way, that is cheap, that gets around the leakage problems, is high
<phase shifters>

Yes, in function, that's basically what satellite transponders do with somewhat
different h/w.

> This whole area of discussion really gets wild tho. Like, we could have a
> network, where theusers do not even have radios! With a modulated retrore-
> flective antenna - amps. As a RF power source scans across each user, his

 It really does get fun to think about the possibilities. Letting a bunch of
locals in on the fun by "fixing" the paths among them *really* changes
the scene. All of a sudden, everyone is on a hilltop. It has a lot about
it that is similar to what has made voice repeaters popular, only with
flexibility to play with radios and modes as each user sees fit.

In cases where all users "agree" and run the same protocol, letting the
repeater poll each of them and letting their hardware get simpler is
possible. However, I don't think there is a lot of extra cost involved
in making a complete radio, rather than a modulated amplifier, and it
leaves the door open for easy upgrades and simultaneous multiple use.

I had a slightly alarming thought over lunch today though... What happens
when one of these is run at a high level site during a vhf/uhf contest?
There might be some extra contacts that shouldn't "count" according to the
current rules. 1/2 (:>)

Glenn

6. Re: [SS:519] RE: Updated Pages

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 03 Oct 96 17:56:29 UTC
To: ss@tapr.org
Message-ID: <11118@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Glenn,

 This just occured to me. Dewayne has this Start Trek idea. The retro-
reflective antenna amp would make a great Star Trek style Lapel pin commun-
icator technology, hi.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

7. Re: [SS:520] RE: Updated Pages

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 4 Oct 1996 07:19:30 -0800 (PDT)
To: ss@tapr.org
Message-ID: <199610041419.AA051848770@hpsadr2.sr.hp.com>
Rendered body type: text/plain

>
> This just occured to me. Dewayne has this Start Trek idea. The retro-
> reflective antenna amp would make a great Star Trek style Lapel pin commun-
> icator technology, hi.
>
>
Don

 Sounds great! Maybe we can integrate it with a transporter and finally
be able to beam up as well (:>)

  73
  Glenn

8. Re: [SS:521] RE: Updated Pages

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 04 Oct 96 16:53:55 UTC

To: ss@tapr.org
Message-ID: <11134@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Glenn,

 On a more practical side. The OCAR reduces the resource, at the benefit of cheap connectivity. On one side of a hill, communication can occur independantly, from the other side of a hill. Thus doubling the resource, until communication is needed between the two sides. With an OCAR, the resource is halfed, all the time.

 I like ur web page about the REDWOOD paths. Yes, that s the very problem. And the DDMA/WAN idea was a way to have the hardware discover these paths on its own. Its not possible, to fund, in ham radio, site/path survey teams. We need to automate this into the equipment, and then just put more copies of such equipment into the field, and if connectivity doesn t happen, put more copies at problematic places. The REDWOOD situation would never need any hardware modification, or new siting. The path would just get used. And, maybe a few years from now, a nosey operator might try and find out why the equipment is sending the RF 50 miles, to get 3 miles away, hi.

 OCAR s would be a good idea for the mountain states. Here, u could have 10 MHz worth of bandwidth, in a state wide coverage zone, with only few OCARs, since 1 st fresnel paths are all over, and the OCARs would interconnect the areas isolated from each other. With the sparce population, 10 Mhz should be enuf forever.

 There is a concern tho. In areas such as the Chicagoland area, where a single site cannot cover the whole area of interest, multiple OCAR s would be needed. Designing and controlling a system of multiple OCAR's, would be quite a challenge, in a small (rf wise) space. If conditions are such that the source station is propagating over a hill, the signal combined with the repeated signal, would probably be useless. There are also aircraft reflections, besides tropo-scatter/ducting variability. Is this a technology better suited for 24 Ghz, that is bands where water destroys path, rather than enhances them?

  The OC (on-channel) aspect of the OCAR just makes this all so problematic. This allows two repeaters to oscillate, if conditions are right. Using a phase shifter based translator, or IRM allows the idea to be generally implemented, without this possibility. But, for multiple repeat systems, it doubles the cost, as two repeaters are needed (on seperate in/out freqs), at each site.

  Possibly, the CELLNET architecture could be applied. Have 3 input bands, with phase shifter on each, running at different rates, so that all three input bands come out on one output band. Hmm. Its not pretty. How does one do the reverse path, in a area mesh?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

9. DES chip for Wavelan cards.

From: Bernie Doehner <bad@uhf.wdc.net>
Date: Sun, 6 Oct 1996 18:09:56 -0400 (EDT)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.961006180308.7410A-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi:

Does anyone have a NCR Wavelan card with DES installed chip?

We are developing a Wavelan driver for FreeBSD and I would like to test the DES code in our driver. I hope that NCR used a standard part that I can buy from one of the companies that makes DES chips.

(This is for the first generation full-height Wavelan cards, where the RF deck is an integral part of the card (and not on a daughterboard).

Also: If someone is interested in being a beta tester, let me know.

Bernie nu1s

10. Re: [SS:523] DES chip for Wavelan cards.

From: Igor Sviridov <sia@nest.org>
Date: Sun, 6 Oct 1996 21:39:02 -0500 (CDT)
To: ss@tapr.org
Message-ID: <199610070239.VAA20150@seagull.nest.org>
Rendered body type: text/plain

Quoting Bernie Doehner letter:
> Hi:
>
> Does anyone have a NCR Wavelan card with DES installed chip?
>
> We are developing a Wavelan driver for FreeBSD and I would like to test
> the DES code in our driver. I hope that NCR used a standard part that
> I can buy from one of the companies that makes DES chips.

[sorry, this is not about DES chip]

I'm using right now Wavelan under FreeBSD with driver by
Jim Binkley <jrb@cs.pdx.edu>:

>
> Date: Mon, 05 Aug 1996 17:38:21 -0700
> From: Jim Binkley <jrb@cs.pdx.edu>
> To: freebsd-mobile@FreeBSD.ORG
> Sender: owner-mobile@FreeBSD.ORG
> Subject: mobile-ip alpha release for freebsd2.1R and wavelan update
>
>
> Greetings,
>
> We have put release of our alpha Mobile-IP code out at
>
> ftp://zymurgy.cs.pdx.edu/pub/mobility/mip.tar.gz
>
> along with a re-release of the wavelan drivers.
>
> The Mobile-IP release was done on FreeBSD 2.1R and
> includes kernel changes necessary for mobile-ip. We provide
> src and binaries for the routing daemons and utilities used with them.
> The Mobile-IP release is based on draft 15 which is included. We will
> be working on updating it to draft 17 over the summer.
>
> We based our release to some extent on ATT WaveLAN radio cards
> and the drivers plus some new config utilities are present in the code.
> (However our Mobile-IP should work with ethernet as well).
> The wavelan code is both IN mip.tar.gz and in a separate wavelan.tar.gz
> file. Drivers are included for the ISA wavelan card and for the PCMCIA
> card. There are some mods to the drivers that people may not have
> as there are some ioctls and other instrumentation that did not previously
> exist. Note: a possible patch by Matt Thomas for the wlp0 pcmcia driver and
> a major remunge by Jon Inouye for the 2.2SNAP/pcmcia socket support
> is not in there yet. There are two little utilities supplied that
> may be of interest. One can get/set the NWID at runtime (both wl and wlp).
> The other can read out signal strength and other related parameters
> (only wlp). The drivers supplied are compatible with 2.1R.
>
> Any communication on the subject should be sent to:
>
> mobileip@zymurgy.cs.pdx.edu
>
> The code can also be accessed on the web via:
>
> http://www.cs.pdx.edu/research/SMN
>
>   regards,
>
>   Jim Binkley
>   jrb@cs.pdx.edu
>

--
igor

11. Re: [SS:522] RE: Updated Pages

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Mon, 7 Oct 1996 08:33:29 -0800 (PDT)
To: ss@tapr.org
Message-ID: <199610071533.AA081252409@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Don writes:
> On a more practical side. The OCAR reduces the resource, at the benefit of
> cheap connectivity. On one side of a hill, communication can occur inde-
> pendantly, from the other side of a hill. Thus doubling the resource, until
> communication is needed between the two sides. With an OCAR, the resource is
> halfed, all the time.

Well, the problem of getting lots of bandwidth to a lot of users has
a variety of constraints it can bounce off. It might
be a little like the dual problems

1) I have no money. 2)I have so much money I don't have
a place to put it.

 If we had perfect paths on a totally flat earth we might find that every
information transaction could be a single hop but that we had to
coordinate like crazy to share the resource to do it.

 If we had a very lossy set of terrain/paths with a curved earth (and we
generally do) we can get only a very small number of links but don't
need much spectral coordination.

However, all other things equal, I'll take the first scenario because
the waste is (or could be) a great deal less; at least up to the point
that it is no longer possible to get the necessary
cooperation/coordination. This means that total system cost is lower.
Within amateur radio today, I'm a little afraid to look to see where the
the link-limited/coordination-limited boundary occurs. Maybe it really
is with each ham not being able to work anyone else. I hope it is a bit
higher than that though.

Put another way, while the per-user portion of the total resource might
be halved with an OCAR, the total information efficiency can be a
million times better (*if* we can cooperate). I'll take the 3 dB
penalty in that situation. In fact, I'd love it if we had that problem.

At the moment I don't know of many highspeed, wideband amateur systems
which are suffering from the problem you suggest. ATV repeaters are
about the only thing I can think of that seem likely. Even that sort of
problem could probably be solved easily with antenna directivity and
path/site selection *if* those involved would cooperate.

> I like ur web page about the REDWOOD paths. Yes, that s the very problem. And
> the DDMA/WAN idea was a way to have the hardware discover these paths on its
> own. Its not possible, to fund, in ham radio, site/path survey teams. We need
> to automate this into the equipment, and then just put more copies of such
> equipment into the field, and if connectivity doesn t happen, put more copies
> at problematic places. The REDWOOD situation would never need any hardware
> modification, or new siting. The path would just get used. And, maybe a few
> years from now, a nosey operator might try and find out why the equipment is
> sending the RF 50 miles, to get 3 miles away, hi.

  I'm not sure that any mortal is up to making a totally
self-configuring system that can solve amateur radio's coordination
problems for it, unless it is one which simply eliminates the hobby.
It's for this reason that I suggested in one of the CNC papers that I
thought cooperation and coordination a bigger issue (if/when we ever get
to the point of having that problem with high speed systems) than the
technical one.

  If the user base and resource contention increased enough, I'd expect
someone other than a nosey operator to notice it sooner.

> OCAR s would be a good idea for the mountain states. Here, u could have 10
> MHz worth of bandwidth, in a state wide coverage zone, with only few OCARs,
> since 1 st fresnel paths are all over, and the OCARs would interconnect the
> areas isolated from each other. With the sparce population, 10 Mhz should be
> enuf forever.

  I like the idea of OCARs for a social reason as well. It has the same
flavor to it as nbfm repeaters; that is, a small group of locals
(unfortunately its usually one or two individuals doing all the work)
cooperating to put the right hardware in place for each other in the
locale that lets there otherwise-unusable HT do something interesting
(to them, anyway). It requires local adaptation to local problems.
It's a small-government model, I suppose.

> There is a concern tho. In areas such as the Chicagoland area, where a single
> site cannot cover the whole area of interest, multiple OCAR s would be needed.
> Designing and controlling a system of multiple OCAR's, would be quite a chal-
> lenge, in a small (rf wise) space. If conditions are such that the source
> station is propagating over a hill, the signal combined with the repeated
> signal, would probably be useless. There are also aircraft reflections, be-
> sides tropo-scatter/ducting variability. Is this a technology better suited
> for 24 Ghz, that is bands where water destroys path, rather than enhances them?

I need to add some detail about the preferential layout for OCARs to minimize the multipath-contaminated area you mention. Ideally, the OCAR uses a directional antenna and is located at the outskirts of the mass of users, not in between them.

If there is already suitable propagation over the hill, there should probably not be an OCAR there. The terrain limited regions are generally smaller at higher frequencies (where therer's also more bandwidth). I don't think we should normally be putting OCARs up on 2M nor probably even on 450 MHz.

OCARs are not a panacea, but I think they do offer a useful flexibility for certain situations and might serve to further the hobby in general.

> The OC (on-channel) aspect of the OCAR just makes this all so problematic.
> This allows two repeaters to oscillate, if conditions are right. Using a phase
> shifter based translator, or IRM allows the idea to be generally implemented,
> without this possibility. But, for multiple repeat systems, it doubles the
> cost, as two repeaters are needed (on seperate in/out freqs), at each site.

Avoiding oscillation of two is just a case of the requirement of achieving adequate antenna isolation for the 2nd one. This needs to be addressed for each installation. OCARs, like any other wider area resource must be coordinated. They don't self-configure. Hams have to get along if we're going to share our resources. This is the root problem.

> Possibly, the CELLNET architecture could be applied. Have 3 input bands,
> with phase shifter on each, running at different rates, so that all three input
> bands come out on one output band. Hmm. Its not pretty. How does one do the
> reverse path, in a area mesh?

I don't think I'd want to try. The goal of the OCAR is to get an area large enough to contain a critical mass of users to be able to communicate with low incremental path loss so that higher capacity information systems can function. We aren't trying to "flatten" the entire earth. We still want to trunk multiple regions together with point-point hardware.

If/When the user density gets big enough that per-user performance is impacted the area should be subdivided; the first OCAR should be eliminated and "the right thing" should be done among each of the resulting groups to keep communciations efficiency high enough. This probably means adding another level of hierarchy.

I'll try and get some more hardware and result information about our OCAR experiene here up on the web pages before too long.

Thanks for your thoughts and comments.

Glenn

12. Re: [SS:525] RE: Updated Pages

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 07 Oct 96 14:33:37 UTC
To: ss@tapr.org
Message-ID: <11156@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Glenn,

The scenerio 1 result is that you cannot communicate with any other hams. Without Money (time being an equivalent), there is no way to make a system.

Scenrio 2, is the situation that the local packet club was in for many years, to the point that it has lost allot of its vitality. Without coordination, , even those with sufficient funds cannot communicate as required by the application.

The result with the local club, is that Scernerio 2 has led to Scenerio 1.

Well, YES, ATV is the model of the next generation Packet Radio systems. If we bull ahead, without forethought, we will fall into the same trap. And, so like u say, we need directivity to solve it. But, also, we have to avoid the coordination problem. Because nobody in Ham Radio is going to pay anyone of us to be professional site surveyors and coordinators. Indeed, anybody who tries to do that job will be driven out of ham radio, by the mob. DDMA/WAN gets around this situation, by making the coordination dynamic, and as required. With DDMA/WAN, the cooperation is in using the equipment, not in argueing with a Coordination Organisation for several years.

I can appretiate the idea to use a historically succesful paradigm as a model for future social adoption of new technology. But the fact that a small group comraderie results in a such a major resource monopolisation, reminds me of the very problems of the old paradigm.

But, I think your group may have solved the ATV problem. At 10 Ghz, the stuff is cheap enuf, and the bandwidth available enuf, that the traditionally small group of ATV ers can really have a ball, without being glutunous. Yet, still being very inexpensive, and with good range. MPEG'ers, FMTV'ers and NTSC holdouts can all use the same thing, and contribute to it, without using up a whole band. This multiplies effectiveness, rather than dispersing it. As is the situation now, with TV on 440/900/1.2 Ghz.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

13. Video From Field to Classroom

From: Rick Whiting <rwhiting@winternet.com>
Date: Wed, 9 Oct 1996 19:04:30 -0500 (CDT)
To: ham-digital@ucsd.edu, ss@tapr.org
Message-ID: <199610100004.TAA16990@icicle.winternet.com>
Rendered body type: text/plain

I'm posting the following message from the EDTECH mail list in the hope that someone here might be able to suggest a suitable wireless technology for the air link, e.g., one of the Part 15 spread spectrum products.

Date: Tue, 8 Oct 1996 08:44:51 EDT
From: Rob Ross <serross@sci.shizuoka.ac.jp>
Subject: Possibility to send real-time video from field to classroom?

I have been searching the literature for a way to broadcast nature into the classroom, but the closest I've come is teleconferencing from a laboratory setting.   I would greatly appreciate any advice anyone may have on this.
[I apologize for any cross-postings you may have received.]

A bit more explanation:
I am looking for a way to send a video signal from a remote location -- i.e., outdoor settings (e.g., forests, beaches, anyplace...) -- to a classroom. One teacher would go into the field with a camera, and communicate with (and be directed by) another teacher and students in a class.   The purpose would be to get students in contact with the field on a very regular basis when field trips are unfeasible -- and enable the advantages of interaction within a classroom.

The video would only need to go one way of course; the teacher in the field need only receive audio. My needs sound like those of a news broadcast, with an anchor and someone reporting from location. But I imagine that the technology, such as satallite links, would be unavailable for individual classes.

I wonder if it is possible to send a good video signalfrom a remote location that could be picked up by modern videoconferencing technology. A couple of suggestions I have had (but that hadn't actually tested): (1) taking a wireless modem and laptop computer with internet videoconfercing software into the field, so long as receivers/transmitters are not too far away, or (2) using a cellular telephone, cellular modem, and laptop with phone-based videoconfercing software. I also found a company called KaStar that intends to use a "Ka band satellite transmission system" for low cost, on demand, interactive videoconfercing, etc. This would work, but it'll be several years before it's in operation, and I wonder how low cost it'll really be.

I would be very grateful if anyone any advice about or experience with this

sort of system.

Thanks.

Sincerely,
Rob Ross

  Richard A. (Rick) Whiting   Home Phone: + 1 612 550 1213
  RF Engineer, AirTouch Cellular   Work Phone: + 1 612 595 5065
  5780 Rosewood Ln. N.   E-mail: rwhiting@winternet.com
  Plymouth, MN 55442-1411   Packet: W0TN @ WB0GDB.MN.USA.NOAM
 ----

14. Re: [SS:527] Video From Field to Classroom

From: bruce@satscan.com
Date: Thu, 10 Oct 1996 05:18:17 -0700
To: ss@tapr.org
Message-ID: <199610101218.FAA02524@satscan.com>
Rendered body type: text/plain

>I'm posting the following message from the EDTECH mail list in the hope that
>someone here might be able to suggest a suitable wireless technology for the
>air link, e.g., one of the Part 15 spread spectrum products.

Why spread spectrum? Why not plain ol' ATV? If you can find a local Ham club
that has an active ATV group they may be able to provide the means for this.
There are many clubs that would be willing to help and would appreciate the
public exposure. I think you will find that SS for this application may be a
bit expensive given the budget restraints that are imposed on the public
school systems.

Bruce KF7PJ

>
>Date: Tue, 8 Oct 1996 08:44:51 EDT
>From: Rob Ross <serross@sci.shizuoka.ac.jp>
>Subject: Possibility to send real-time video from field to classroom?
>
>I have been searching the literature for a way to broadcast nature into the
>classroom, but the closest I've come is teleconferencing from a laboratory
>setting.   I would greatly appreciate any advice anyone may have on this.
>[I apologize for any cross-postings you may have received.]
>
>A bit more explanation:
>I am looking for a way to send a video signal from a remote location --
>i.e., outdoor settings (e.g., forests, beaches, anyplace...) -- to a
>classroom. One teacher would go into the field with a camera, and
>communicate with (and be directed by) another teacher and students in a
>class.   The purpose would be to get students in contact with the field on
>a very regular basis when field trips are unfeasible -- and enable the
>advantages of interaction within a classroom.
>
>The video would only need to go one way of course; the teacher in the field
>need only receive audio. My needs sound like those of a news broadcast,
>with an anchor and someone reporting from location. But I imagine that the
>technology, such as satallite links, would be unavailable for individual
>classes.
>
>I wonder if it is possible to send a good video signalfrom a remote
>location that could be picked up by modern videoconferencing technology. A
>couple of suggestions I have had (but that hadn't actually tested): (1)
>taking a wireless modem and laptop computer with internet videoconfercing
>software into the field, so long as receivers/transmitters are not too far
>away, or (2) using a cellular telephone, cellular modem, and laptop with
>phone-based videoconfercing software. I also found a company called KaStar
>that intends to use a "Ka band satellite transmission system" for low cost,
>on demand, interactive videoconfercing, etc. This would work, but it'll be
>several years before it's in operation, and I wonder how low cost it'll
>really be.
>
>I would be very grateful if anyone any advice about or experience with this
>sort of system.
>
>Thanks.
>
>Sincerely,
>Rob Ross

> ---
> Richard A. (Rick) Whiting   Home Phone: + 1 612 550 1213

> RF Engineer, AirTouch Cellular Work Phone: + 1 612 595 5065
> 5780 Rosewood Ln. N. E-mail: rwhiting@winternet.com
> Plymouth, MN 55442-1411 Packet: W0TN @ WB0GDB.MN.USA.NOAM
> ---
>
>
Bruce Weber, KF7PJ, Satscan Corporation / Cascade Technology
PO Box 1109, Sultan WA 98294-1109 (360)-793-3433 FAX: 793-0359

15. Re: [SS:528] Re: Video From Field to Classroom

From: "Steven R. Sampson" <ssampson@othello.tinker.af.mil>
Date: Thu, 10 Oct 1996 08:34:08 -0500
To: ss@tapr.org
Message-ID: <325CFB50.167E@othello.tinker.af.mil>
Rendered body type: text/plain

bruce@satscan.com wrote:
>
> >I'm posting the following message from the EDTECH mail list in the hope that
> >someone here might be able to suggest a suitable wireless technology for the
> >air link, e.g., one of the Part 15 spread spectrum products.
>
> Why spread spectrum? Why not plain ol' ATV? If you can find a local Ham club
> that has an active ATV group they may be able to provide the means for this.
>
> Bruce KF7PJ

The phrase "If you can find a local Ham club that has an active ATV
group.."
is probably the killer requirement.

On the other hand, most Part-15 devices are made for digital, not video.
That is, they like to see digitized voice or data, with maybe an audio
jack.
The video devices, such as the "Rabbit" type are very short range.

They probably do want to use Ham radio ATV devices, as they are easily
put
together with additional Amps and Beams as needed. Plug and Play...

Steve

November 1996

Original source file: ss.9611
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9611

1. Is this group still active?

```
From: wb9mjn@wb9mjn.ampr.org
Date: Tue, 05 Nov 96 13:59:54 UTC
To: ss@tapr.org
Message-ID: <11338@wb9mjn.ampr.org>
Rendered body type: text/plain
```

```
Have not seen anything from SS, for almost a month.


73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu
```

---

2. Web Pages of Interest [was: Is this group still active?]

```
From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Tue, 05 Nov 1996 21:17:35 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19961106021735.006ba7c4@gnatnet.net>
Rendered body type: text/plain
```

```
At 02:08 PM 11/5/96 -0600, you wrote:
>
> Have not seen anything from SS, for almost a month.


Gee Don, I was just about to post something when you wrote :-).

Here's some SS related web pages I have found recently.

-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

And EDN artical about SS.  Written from a journalist point of view - Caveat
Empor.

    http://www.ednmag.com/CURRENT/101096/21df_02.htm

-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

The Harris Wireless web site has had a face lift.  The PRISM chipset is
getting a lot of press (I'm not sure why, could someone tell me?).  There's
a bunch of application notes and even schematic diagrams for a SS radio!

    http://www.semi.harris.com/prism.html

-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

A new Alliance call the Wireless LAN Alliance (WLANA).  Their home page is
located:

    http://www.wlana.com/index.html

They have an Introduction to Wireless LANs page

    http://www.wlana.com/intro/index.html

-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

WaveLAN now Lucent Technologies (formerly AT&T GIS and NCR) has a very nice
web site.

    http://www.wavelan.com

Take a look at the technical bulletins at:

    http://www.wavelan.com/support/libdocs.htm#technotes

Some interesting things here.

-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

And this is by far the COOLEST page yet. Check out HPs "Interactive Models
from the T&M Application Notes Library" page:

    http://www.tmo.hp.com/tmo/appnotes/interactive/index.html

you need a Java capable browser to fully view this page. Now we need a page
like this for SS!

-+

Has anyone else found a web page that is SS oriented? I know it's about
time to update the SS web pages at the TAPR web site with these new finds.
Soon I hope!

73,

 - Steve, N7HPR
 (n7hpr@tapr.org)

3. Re: [SS:531] Web Pages of Interest [was: Is this group still active?]

From: Lyle Johnson <lylej@azstarnet.com>
Date: Wed, 6 Nov 1996 08:02:49 -0700 (MST)
To: ss@tapr.org
Message-ID: <1.5.4.32.19961106080347.00308e18@pop.azstarnet.com>
Rendered body type: text/plain

>The Harris Wireless web site has had a face lift. The PRISM chipset is
>getting a lot of press (I'm not sure why, could someone tell me?). There's
>a bunch of application notes and even schematic diagrams for a SS radio!
>
>   http://www.semi.harris.com/prism.html

Steve,

We are looking VERY closely at the PRISM chipset for products at work. It
allows us to build a 2 MBPS SS radio system for a cost of well under
$200/radio in small (around 1,000) quantities -- about half the price of ANY
"OEM" modules we have located. And, they have already done much of the hard
work (microstrip line design, PCB layout to work OK at 2.4 GHS and decouple
the digital stuff from the analog stuff). FInally, it allows us to
interface this thing to our on-vehicle electronics package at the CPU bus
level, not some silly serial port or (ugh) modified centronics parallel
printer port.

Anyway, those are a few reasons we're interested :-) Might make a solid
basis for a TAPR SS radio?

Cheers,

Lyle

4. Re: [SS:530] Is this group still active?

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Wed, 6 Nov 1996 13:06:30 -0500
To: ss@tapr.org
Message-ID: <199611061806.NAA01796@Sopchoppy.GASD102designcenter>
Rendered body type: text/plain

>
> Have not seen anything from SS, for almost a month.
>
>
> 73, Don.
>
> Mailbox : WB9MJN @ N9HSI.IL.USA.NA
> AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
> Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu
>
>

Lets start a discussion about the PRISM SS chip set from Harris :)

73s de
Tony, KE4ATO

5. Re: [SS:531] Web Pages of Interest [was: Is this group still active?]

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Wed, 6 Nov 1996 13:18:51 -0500

To: ss@tapr.org
Message-ID: <199611061818.NAA01849@Sopchoppy.GASD102designcenter>
Rendered body type: text/plain

```
> -+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
>
> And this is by far the COOLEST page yet.  Check out HPs "Interactive Models
> from the T&M Application Notes Library" page:
>
>     http://www.tmo.hp.com/tmo/appnotes/interactive/index.html
>
> you need a Java capable browser to fully view this page.  Now we need a page
> like this for SS!
>
> -+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
>
> Has anyone else found a web page that is SS oriented?  I know it's about
> time to update the SS web pages at the TAPR web site with these new finds.
> Soon I hope!
>
> 73,
>
>  - Steve, N7HPR
>  (n7hpr@tapr.org)
>
>

Man, this web site is EXCELLENT !!! If anyone wants to get together and do a spread-spectrum web site in
 this format, let me know!!!

You HAVE to check this site out!!!

73s de
Tony,  KE4ATO
```

6. Re: [SS:530] Is this group still active?

From: dtaylor@usdata.com (Doug Taylor)
Date: Wed, 06 Nov 1996 12:39:45 -0600
To: <ss@tapr.org>
Message-ID: <2.2.32.19961106183945.0069ba38@mailgate.usdata>
Rendered body type: text/plain

```
It seems a little inactive at the present.  If anyone would like, I can post
bulletins and tech info from the Part 15/commercial spread spectrum
publications I receive at work.  If nobody is interested, then I'll refrain.

Since the mood both in Congress and at the FCC is toward less regulation,
many spread spectrum networking and bridging devices are hitting the market.
Some of these devices are higher power than previously marketed systems and
they are designed for long range communications.  They have obvious
applications for packet network backbones.

At 02:54 PM 11/5/96 CST, you wrote:
>
> Have not seen anything from SS, for almost a month.
>
>
>73, Don.
>
>Mailbox : WB9MJN @ N9HSI.IL.USA.NA
>AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
>Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu
>
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>
>
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>
```

7. SS developments

From: Don Hilman <hilman@camosun.bc.ca>
Date: Wed, 06 Nov 1996 23:16:59 -0800

To: ss@tapr.org
Message-ID: <32818CEB.1AFB@camosun.bc.ca>
Rendered body type: text/plain

Would be very interested in seeing more commercial devices discussed. We
are looking at both amateur and commercial apps in our Computer Science
Lab.
VE7FBI

8. Re: [SS:535] Re: Is this group still active?

From: Tom Filecco <tfilecco@bbn.com>
Date: Wed, 06 Nov 1996 14:47:49 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961106194749.00686b1c@po1.bbn.com>
Rendered body type: text/plain

>It seems a little inactive at the present. If anyone would like, I can post
>bulletins and tech info from the Part 15/commercial spread spectrum
>publications I receive at work. If nobody is interested, then I'll refrain.
>
Sounds good to me. Go for it.

-Tom, KA2UCP

9. Looking for Wireless Lan Card

From: Pinchook Ronen <ronen@ronen.netmanage.co.il>
Date: Wed, 06 Nov 96 21:46:04 EST
To: ss@tapr.org
Message-ID: <156643@ronen.netmanage.co.il>
Rendered body type: text/plain

Hello Fellows
Since you said that the mailing list is quiet , here is my question
I'm looking for a Wireless lan card that will be cheep (less then 500 $)
and will give me a High speed rate (at least 1.5MB/s)
with a range of about 8KM (can be with external antennas)
No matter What Band (prefered 2.4Ghz or 1.2GHz)
                        Thanks Forward
                         Ronen - 4Z4ZQ

10. Station ID Requirements

From: "Lee W. Fry" <lfry@wdl.lmco.com>
Date: Wed, 06 Nov 1996 16:09:22 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961106210922.0089f6e8@wdl1.wdl.lmco.com>
Rendered body type: text/plain

OK, Lets get some discussion going. FCC Part 97.119, Station Identification
says:

 (a) Each amateur station, except a space station or telecommand station,
must transmit its assigned call sign on its transmitting channel at the end
of each communication, and at least every ten minutes during a
communication, for the purpose of clearly making the source of the
transmissions from the station known to those receiving the transmissions.
No station may transmit unidentified communications or signals, or transmit
as the station call sign, any call sign not authorized to the station.

And in subpara (5):

By a CW or phone emission during SS emission transmission on a narrow
bandwidth frequency segment. Alternatively, by the changing of one or more
parameters of the emission so that a conventional CW or phone emission
receiver can be used to determine the station call sign.

None of the STA's ask for a waiver to this requirement. Obviously, part 15
devices, being unlicensed have no requirement to ID themselves.

So, say we were working with an off the shelf chip set (For example Prism -
see http://www.semi.harris.com/datasheets/wireless/wireless_family.html),
how could we meet this requirement?

Is there any kind of a data stream that could be input to a DSSS transceiver
that would cause the emission to be such that it would look like a call sign
to a conventional CW or phone emission receiver?

Lee AA0JP

See my Part 15 Device page at http://www.mindspring.com/~lfry/part15.htm

11. Re: [SS:539] Station ID Requirements

From: Kevin Jessup <kevin.jessup@mail.mei.com>
Date: Wed, 06 Nov 1996 16:45:55 -0600
To: ss@tapr.org
Message-ID: <01IBJ6HV9DOY8XAMWD@meipws.mis.mei.com>
Rendered body type: text/plain

At 03:11 PM 11/6/96 -0600, you wrote:

>Is there any kind of a data stream that could be input to a DSSS transceiver
>that would cause the emission to be such that it would look like a call sign
>to a conventional CW or phone emission receiver?

Did you mean DATA stream or CHIP stream?

I don't think changing the DATA stream would have
any affect on the wide-band DSSS emission caused by
the PN stream. You probably didn't mean that.

The idea of playing with the PN stream to produce
non-ss emissions sounds interesting. Can this be done?
I've played with "software radios" on the receive side,
demodulation via DSP, but the transmit side of things
I have not looked at yet.   I can't see manipulating
the PN code entirely in software. Nowhere near fast
enough.

>Lee AA0JP

Kevin, n9sqb

--
kevin.jessup@meipws.mis.mei.com
Marquette Medical Systems
http://www.mei.com

12. Re: [SS:540] Re: Station ID Requirements

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Wed, 6 Nov 1996 18:04:52 -0600
To: ss@tapr.org
Message-ID: <v03007802aea6d7443ec8@[208.134.134.42]>
Rendered body type: text/plain

The one thing that many of agree on is what Phil Karn has proposed. That
is the ID must be within the same power spectrual density as the
transmission. Doesn't matter how it happens, but I think we can agree we
don't need to be swtiching to some narrow-band transmission to ID what we
are doing.

IDing could be an issue on the upcoming SS rules when the FCC finally gets
around to them.

This is something that does need a solution.

Cheers - Greg, WD5IVD

>At 03:11 PM 11/6/96 -0600, you wrote:
>
>>Is there any kind of a data stream that could be input to a DSSS transceiver
>>that would cause the emission to be such that it would look like a call sign
>>to a conventional CW or phone emission receiver?
>
>Did you mean DATA stream or CHIP stream?
>
>I don't think changing the DATA stream would have
>any affect on the wide-band DSSS emission caused by
>the PN stream. You probably didn't mean that.
>
>The idea of playing with the PN stream to produce
>non-ss emissions sounds interesting. Can this be done?
>I've played with "software radios" on the receive side,
>demodulation via DSP, but the transmit side of things
>I have not looked at yet.   I can't see manipulating
>the PN code entirely in software. Nowhere near fast
>enough.
>
>>Lee AA0JP
>
>Kevin, n9sqb

>
>--
>kevin.jessup@meipws.mis.mei.com
>Marquette Medical Systems
>http://www.mei.com

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

13. Re: [SS:539] Station ID Requirements

From: Jeff King <jeff@mich.com>
Date: Wed, 06 Nov 1996 19:17:30 -0500
To: ss@tapr.org
Cc: ss@tapr.org
Message-ID: <2.2.32.19961107001730.006996cc@mail.mich.com>
Rendered body type: text/plain

At 03:11 PM 11/6/96 -0600, Lee W. Fry wrote:
>OK, Lets get some discussion going. FCC Part 97.119, Station Identification
>says:
clip
>And in subpara (5):
>
>By a CW or phone emission during SS emission transmission on a narrow
>bandwidth frequency segment. Alternatively, by the changing of one or more
>parameters of the emission so that a conventional CW or phone emission
>receiver can be used to determine the station call sign.
>

clip
>
>Is there any kind of a data stream that could be input to a DSSS transceiver
>that would cause the emission to be such that it would look like a call sign
>to a conventional CW or phone emission receiver?
>
>Lee AA0JP
>

Just key the RF. If a narrowband can detect the SS station then it will be
able to detect the "morse code" being sent via the noise floor rising and
failing in unison with the morse code. I think(?) that would comply with
subpara (5) which you cite. Most SS trancievers have a 'test' mode (including
the freewave) in which you can generate continous RF.

73

Jeff WB8WKA
Linked to the internet via a FreeWave

14. Re: [SS:531] Web Pages of Interest [was: Is this group still active?]

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Thu, 7 Nov 1996 03:52:42 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199611070352.DAA23112@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Steve wrote:
> Has anyone else found a web page that is SS oriented? I know it's about
> time to update the SS web pages at the TAPR web site with these new finds.
> Soon I hope!

No new web sites to add, but I thought I'd mention my Wireless LAN/MAN
Modem page (http://hydra.carleton.ca/info/wlan.html), as some of you may
not have run across it. I've done a bit of updating of late, but still
have some new stuff to add when I get a 'round tuit'. Aside from the
EDN article which has been mentioned, here are a couple of other recent
articles which are worth a look (especially the IEEE one - the other one
is basically a thinly-disguised ad for WaveLAN):

Richard LaMaire et al, "Wireless LANs and Mobile Networking: Standards
and Future Directions", IEEE Communications Magazine, August 1996, pp. 86-94.

Adriaan Kamerman, "Spread-Spectrum Techniques Drive WLAN Performance",
Microwaves & RF, September 1996, p. 109ff.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

15. Re: [SS:538] Looking for Wireless Lan Card

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Thu, 7 Nov 1996 04:28:20 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199611070428.EAA23157@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

> Hello Fellows
> Since you said that the mailing list is quiet , here is my question
> I'm looking for a Wireless lan card that will be cheep (less then 500 $)
> and will give me a High speed rate (at least 1.5MB/s)
> with a range of about 8KM (can be with external antennas)
> No matter What Band (prefered 2.4Ghz or 1.2GHz)
> Thanks Forward
> Ronen - 4Z4ZQ

You didn't mention the most important parameter: what your 8 km path
looks like. If it is line of sight, you have some options... on the
other hand, if the path is blocked by hills or typical urban clutter -
good luck! :-)

I've run Proxim RangeLAN2 cards (2.4 GHz FH, 1.6 Mbps, $399) over a good
7 km path with antennas of around 20 dBi gain. The link margin
(measured using attenuators) indicated that a range of 3-4 times that
would be attainable, provided the path remained clear.

There are some other possibilities, such as 2.4 GHz WaveLAN (2 Mbps),
but unless you can find them discounted, they will be > $500.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

16. Re: [SS:541] Re: Station ID Requirements

From: Richard Parry <rparry@qualcomm.com>
Date: Thu, 7 Nov 1996 06:44:28 -0800
To: ss@tapr.org
Message-ID: <v03007802aea7a5e9ddf8@[129.46.159.136]>
Rendered body type: text/plain

Talking about the FCC STA ruling, how long do these things take. Is
there a best guess as to when the decision will be made?

>
>IDing could be an issue on the upcoming SS rules when the FCC finally gets
>around to them.
>

Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
Globalstar/Gateway Reverse Link Software Engineer
Internal Web --> <http://qcwww/~rparry>
External Web --> <http://www.qualcomm.com/~rparry>
---

17. Re: [SS:544] Re: Looking for Wireless Lan Card

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Thu, 7 Nov 1996 07:17:28 -0800 (PST)
To: ss@tapr.org (Barry McLarnon VE3JF)
Message-ID: <199611071517.AA081639849@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Ronen wrote:

> > I'm looking for a Wireless lan card that will be cheep (less then 500 $)
> > and will give me a High speed rate (at least 1.5MB/s)
> > with a range of about 8KM (can be with external antennas)

> > No matter What Band (prefered 2.4Ghz or 1.2GHz)
> >   Thanks Forward
> >   Ronen - 4Z4ZQ

Barry replied

> You didn't mention the most important parameter: what your 8 km path
> looks like. If it is line of sight, you have some options... on the
> other hand, if the path is blocked by hills or typical urban clutter -
> good luck! :-)
>
> I've run Proxim RangeLAN2 cards (2.4 GHz FH, 1.6 Mbps, $399) over a good
> 7 km path with antennas of around 20 dBi gain. The link margin
> (measured using attenuators) indicated that a range of 3-4 times that
> would be attainable, provided the path remained clear.
>
> There are some other possibilities, such as 2.4 GHz WaveLAN (2 Mbps),
> but unless you can find them discounted, they will be > $500.
>

I agree with Barry, everything depends upon the path. But there is yet
another possibility, put up an OCAR and *fix* the bad paths. This can
be less expensive than any of the other radio hardware and potentially
lets almost any of it work, even over considerable distance.

See
http://www.tapr.org/~n6gn/index.html
for OCAR information.

73

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

18. Re: [SS:541] Re: Station ID Requirements

From: "Lee W. Fry" <lfry@wdl.lmco.com>
Date: Thu, 07 Nov 1996 11:23:04 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961107162304.008afafc@wdl1.wdl.lmco.com>
Rendered body type: text/plain

At 06:09 PM 11/6/96 -0600, you wrote:

>The one thing that many of agree on is what Phil Karn has proposed. That
>is the ID must be within the same power spectrual density as the
>transmission. Doesn't matter how it happens, but I think we can agree we
>don't need to be swtiching to some narrow-band transmission to ID what we
>are doing.
>
>IDing could be an issue on the upcoming SS rules when the FCC finally gets
>around to them.
>

What did Phil propose where? The only reference I found on TAPR's RM8737
page page in the Comments were in TAPR's 2/26/96:

TAPR also differs with the ARRL as to how station identification and
documentation should be handled under a revised set of rules. The ARRL in
its petition did not ask the Commission to delete sections 97.311(e) and
97.119(b)(5) of the rules, even though it questioned the practicality of the
requirements set forth in these sections. TAPR, in contrast, recommends that
the Commission delete these subsections of the rules. The interference and
harm to the band in which an SS station is operating that would be caused by
a requirement to use a CW identification outweighs the benefits that would
accrue for monitoring purposes from the use of the ID.

As a result, the amateur radio community should be permitted to develop an
approach for handling the necessary functions of monitoring and
identification. TAPR already is working on possible resolutions to this
problem and in the near future will be in a position to make a proposal to
the Commission on this matter.

And in National Communications System's 2/26/96 (Which TAPR supported on 3/11):

The Manager notes that while the League questions the practicality of

Section 97.119(b)(5) of the Rules (which contains the CW identification
requirement for spread-spectrum communications), it does not propose a
modification thereto. (Petition, footnote 7.) The Manager proposes that the
requirements be deleted. To the best of the knowledge of the Manager, no
currently available Commercial Off the Shelf (COTS) SPREAD-SPECTRUM
equipment complies with the rule. Deletion of the requirement will likely
lead to increasingly available COTS equipment for amateur use of
spread-spectrum technology and concurrent increased usage.

19. Re: [SS:544] Re: Looking for Wireless Lan Card

From: "John A. Hansen" <hansen@ait.fredonia.edu>
Date: Thu, 07 Nov 1996 13:02:55 -0500
To: ss@tapr.org
Message-ID: <3282244F.75AF@ait.fredonia.edu>
Rendered body type: text/plain

Barry McLarnon VE3JF wrote:
>
> I've run Proxim RangeLAN2 cards (2.4 GHz FH, 1.6 Mbps, $399) over a good
> 7 km path with antennas of around 20 dBi gain. The link margin
> (measured using attenuators) indicated that a range of 3-4 times that
> would be attainable, provided the path remained clear.
>
> There are some other possibilities, such as 2.4 GHz WaveLAN (2 Mbps),
> but unless you can find them discounted, they will be > $500.
>
> Barry
>
> --
>   Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
>   Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
>   Packet Working Group | Web: http://hydra.carleton.ca

This is interesting stuff Barry. Are you using one of Proxim's access
points or is this a card to card setup? Also, are you buying directly
from Proxim or a reseller? Finally. is this $399 Canadian. We've
done a fair amount of work with the BreezeCom 3 Mbits/sec stuff but
the prices are significantly higher.

Thanks,

John WA0PTV

20. Re: [SS:545] Re: Station ID Requirements

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Thu, 7 Nov 1996 17:36:23 -0800
To: ss@tapr.org
Message-ID: <v03010705aea83e8233ff@[202.131.0.100]>
Rendered body type: text/plain

At 8:49 AM -0600 11/7/96, Richard Parry wrote:
>   Talking about the FCC STA ruling, how long do these things take. Is
>there a best guess as to when the decision will be made?

        The TAPR SS STA should be issued by close of business on Friday by
the FCC. We asked the that special SS ID requirements be waived, so you
can put your concerns about complicated ID procedures to rest.

-- Dewayne

--
~~~~~~
Dewayne Hendricks, WA8DZP ! CIS: 75210,10 AOL: HENDRICKS
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854   !
~~~~~~

21. Re: Questions About Spread Spectrum (fwd)

From: Steve Stroh <strohs@halcyon.com>
Date: Fri, 8 Nov 1996 15:14:49 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>
Message-ID: <Pine.ULT.3.95.961108151419.23148B-100000@chinook.halcyon.com>
Rendered body type: text/plain

Since the list is slow at the moment, I thought I'd forward this from
comp.dcom.telecom.

Steve

--
Steve Stroh N8GNJ   strohs@halcyon.com | Amateur Spread Spectrum is
Amateur Radio TCP/IP n8gnj@sw.n8gnj.ampr.org | the wave of the present!

---------- Forwarded message ----------
Date: 3 Nov 1996 18:12:38 GMT
From: dave@oldcolo.com
Newsgroups: comp.dcom.telecom
Subject: Re: Questions About Spread Spectrum

In <telecom16.570.14@massis.lcs.mit.edu>, hbaker@netcom.com (Henry
Baker) writes:

> In article <telecom16.563.6@massis.lcs.mit.edu>, hbaker@netcom.com (Henry
> Baker) wrote:

>> Spread spectrum techniques were invented around the time of World War
>> II, by the actress Hedy Lamarr, among others, who obtained a U.S.
>> patent for a frequency agile torpedo control system.

> Altavista search turned up the following information:

> U.S. Patent #2,292,387 (1942 ??)
> Hedy K. Markey and George Antheil. "Secret Communications System".
> "Markey" was Lamarr's real name, and Antheil was a symphony composer, hence
> the suggestion to use 88 different frequencies (get it? 88 keys on the
> piano...) for 'frequency hopping'.

Ah yes. And spread spectrum is used in a whole bunch (50-60 company's
products) for no-licence, quite high-speed (2,3Mbps), secure data
communications. If you check through our NSF Wireless Field Test
Project web site http://wireless.oldcolo.com and go into the
Regulatory section, you will find, as the last item, a link to a site
which tracks all the companies.

It sure works. Our NSF Team has just connected up 8 sites (university,
educational, research, mainly) in Ulaanbataar, Mongolia, at 115Kbps,
spread spectrum from 1 to 10km across town where the PTT can't provide
any data lines, (just poor POTS). Linking them to the
satellite-sprintlink fed ground station web site http://www.magic.mn
so they can traverse the net, and share the very stiff cost of the
satellite feed (only 128kbs for about $6,000 a month)

A model a lot of Third World countries are beginning to look at.

As for Hedy Lamarr - the question mark after 1942 is not necessary.
Depending on versions of the story, Hedy was an Austrian actress, her
then husband hob nobbed with German military types, and the concept of
spreading the signal over many frequencies was discussed. As a
solution to their battlefield communications problem - unjammable,
uninterceptable, clandestine communications. Even without encryptian.
She left Austria before WWII and, in Hollywood, pursued the matter
with the musician. Some would claim she was so bright she could have
been a physicist. But she was so beautiful, she was quite an actress.

So when I build my first *really* advanced spread spectrum radio I'm
going to put a sticker-logo on the sides of it, with a sketch of Hedy,
in the style of the art on WWII bombers, and the notice 'Hedy Lamarr
Inside.'

BTW, this posting is coming to you by spread spectrum. You can
http://192.160.122.3 and get a little look. Last miles from my office
to my home-office is wireless, SS. Not blindingly fast because it is
slowed down by the frame relay wired connection to the net from our
office - which we expect to replace by a 3Mbps 3 mile direct ss
connection to an ISP server, bypassing totally the local US West loop
(and its T-1 costs).

Dave Hughes
dave@oldcolo.com

22. TAPR Spread Spectrum STA Granted

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sat, 9 Nov 1996 01:28:37 -0600

To: "TAPR-BB list mailing"<tapr-bb@tapr.org>,
" Spread Spectrum "<ss@tapr.org>,
"NETSIG list mailing"<netsig@tapr.org>,
" AMSAT BB Mail Group "<amsat-bb@amsat.org>,
"Bill Westradio Pasternak"<billwa6itf@aol.com>,
"Len KB7LPW Winkler"<lenwink@indirect.com>,
"Hap KC9RP RAIN Holly"<hholly@ais.net>,
"Dave Wolf TCET"<wo5h@tapr.org>, "Greg Jones WD5IVD" <wd5ivd@tapr.org>,
"Rich CQ VHF"<NW2L@aol.com>,
"Gagne, Jennifer, N1TDY" <jgagne@arrl.org>,
"Donald Rotolo"<73227.2644@compuserve.com>,
"Stan Horzepa"<stanzepa@nai.net>,
" Bob Hansen (TAPR) "<psr@tapr.org>,
"Paul Rinaldo"<prinaldo@interramp.com>,
" TAPR SYS "<tapr-sys@tapr.org>
Message-ID: <v03007803aea9dae8aced@[208.134.134.42]>
Rendered body type: text/plain

TAPR's Spread Spectrum Special Temporary Authorization is Granted
November 8th, 1996

The FCC has granted a Special Temporary Authorization (STA) to Greg Jones, WD5IVD, and Dewayne Hendricks, WA8DZP, on behalf of TAPR (Tucson Amateur Packet Radio, Corp), regarding spread spectrum communications. On April 10th, 1996, TAPR requested a waiver of the rules and regulations governing Amateur Radio spread spectrum communications in order to conduct an experimental program to test spread spectrum emissions over amateur radio facilities on different bands.

Full details on the TAPR spread spectrum STA are available on its web page <http://www.tapr.org> under the Spread Spectrum area.

A Special Temporary Authorization (STA) is the authority granted to a permittee or licensee to permit the operation of a broadcast facility for a limited period at a specified variance from the terms of the station authorization or requirements of the FCC rules applicable to the particular class of station.

TAPR recently released a position statement on Spread Spectrum Technology Development which in part states, "TAPR believes that the technical facts support our conviction that conventional and spread spectrum systems can coexist without detriment to conventional systems on all frequencies from MF to EHF. To this end, TAPR will begin to research spread spectrum systems that will develop technology for future deployment." (<http://www.tapr.org/ss/>)

TAPR plans to continue its leading role in developing standards and technology for spread spectrum communications for the amateur radio community through discussion groups, cooperative efforts and experimental programs such as now being permitted by the recently granted STA. In particular, due to the rapid development of communications hardware and software, TAPR believes that the use of hybrid spread spectrum emissions, as well as spreading codes not envisioned by Section 97.311(d) of the Rules can be employed without causing harmful interference to other amateur radio operators.

TAPR was founded in 1982 as an international organization with interests in the areas of packet and digital communications. Today, TAPR continues as a membership supported nonprofit amateur radio research and development organization, and currently has more than 2,000 members worldwide. TAPR continues to develop kits for the amateur radio community and is working actively on publications and communications standards.

Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000
---
e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org web: <http://www.tapr.org/>

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

23. Re: [SS:548] Re: Looking for Wireless Lan Card

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Mon, 11 Nov 1996 04:51:04 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199611110451.EAA28274@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

> This is interesting stuff Barry. Are you using one of Proxim's access
> points or is this a card to card setup? Also, are you buying directly
> from Proxim or a reseller? Finally. is this $399 Canadian. We've
> done a fair amount of work with the BreezeCom 3 Mbits/sec stuff but
> the prices are significantly higher.

This was using the ISA cards... I also have a PCMCIA version for
portable use. The cards were purchased direct from Proxim - $399 US for
the ISA card, and $449 for the PCMCIA. The PCs were running Win95 or
JNOS (with packet driver) - no AX.25. At one time they had these prices
posted on their web site, but they seem to have removed the pricing
info, so I'm not sure what the current prices are. Dave Koberstein N9DK
works at Proxim and has been very helpful... I think he also reads this
list, so maybe he'll chip in with some comments.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

24. Re: [SS:552] Re: Looking for Wireless Lan Card

From: Dave Koberstein <davek@komacke.com>
Date: Mon, 11 Nov 1996 12:07:32 -0800
To: ss@tapr.org
Message-ID: <3.0.32.19961111120703.006a9fdc@sydney.komacke.com>
Rendered body type: text/plain

I just subscribed and this is the first message I have received. Since I
didn't get the previous messages, I'm not sure if my comments are out of
context.

I believe the price holds for the first 2 copies of any card. It's a
buy-in offer to get people started and evaluating. At the moment, we'll
only sell the ham version to hams in Canada that provide a copy of their
license. The reason is we have to configure the card to Canadian ham freqs
instead of Canadian ISM freqs. We are concerned about putting our ISM type
acceptance at risk with the authorities if they think we are distributing
non-ISM products to general users. The US ham regs aren't loose enough yet
to sell to US hams (ID, hop patterns).

Anyway, I'll provide an email address to this list of the person to contact
at Proxim to get some cards. Or I'll reply to you personally. I don't
want to be perceived and try to conduct business on the list. ;-)

Davek

At 11:07 PM 11/10/96 -0600, you wrote:
>> This is interesting stuff Barry. Are you using one of Proxim's access
>> points or is this a card to card setup? Also, are you buying directly
>> from Proxim or a reseller? Finally. is this $399 Canadian. We've
>> done a fair amount of work with the BreezeCom 3 Mbits/sec stuff but
>> the prices are significantly higher.
>
>This was using the ISA cards... I also have a PCMCIA version for
>portable use. The cards were purchased direct from Proxim - $399 US for
>the ISA card, and $449 for the PCMCIA. The PCs were running Win95 or
>JNOS (with packet driver) - no AX.25. At one time they had these prices
>posted on their web site, but they seem to have removed the pricing
>info, so I'm not sure what the current prices are. Dave Koberstein N9DK
>works at Proxim and has been very helpful... I think he also reads this
>list, so maybe he'll chip in with some comments.

_____
Dave Koberstein
  work: davek@proxim.com / http://www.proxim.com
  keep in touch: davek@komacke.com / http://www.komacke.com
  ham internet: n9dk@n9dk.ampr.org [44.4.12.172]
   (ax.25/PBBS: n9dk@w6yx.#nocal.ca.usa.noam)

25. Spread Spectrum STA Granted, Now what?

From: Richard Parry <rparry@qualcomm.com>
Date: Tue, 12 Nov 1996 12:22:19 -0800
To: ss@tapr.org
Message-ID: <v03007800aeae89c85d97@[129.46.159.136]>
Rendered body type: text/plain

Congratulations to the "movers and shackers" of the SS STA and those
prepared to move Amateur Radio to the next generation (Spread Spectrum)!!!

   I suppose the granting of the STA means that we can all go off and start
doing our own thing. But I wanted to join a group (I think). SS is not a
weekend project, so I wonder how I can get involved in a small group to
contribute or at least hear about the cutting edge? This mailing is start
I suppose but it seems that a standard needs to be developed, anyone
thought about it?

   I guess I am confused if people are going to go out and start at the
"chip" level? I think the answer is yes. What is TAPR doing?

   Comments, suggestions?

Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
Globalstar/Gateway Reverse Link Software Engineer
Internal Web --> <http://qcwww/~rparry>
External Web --> <http://www.qualcomm.com/~rparry>
---

26. Where are the experimenters?

From: "Lee W. Fry" <lfry@wdl.lmco.com>
Date: Tue, 26 Nov 1996 16:55:08 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961126215508.008ce3b4@wdl1.wdl.lmco.com>
Rendered body type: text/plain

In the two weeks since the TAPR STA was granted, there has barely been a
peep out of this list. The current participating station list has about 25
names on it and only a hand full have even posted here before: Greg,
Dewayne, Steve B. and Steve S. and Jeff. Where are the others and what are
they doing?

Questions:

I suspect the FW and WL code on the list indicates FreeWave and WaveLan
based projects. True?

Is there a commercial 5 watt amp that the FW crowd is looking at?

Can anybody with 1 watt systems report sucesses with > 6dbi (non-stock)
antennas?   What antennas?

Thanks - Lee (AA0JP In the middle of Georgia!)
See Part 15 SS Device Compendium at http://www.mindspring.com/~lfry/part15.htm
Lee W. Fry
lfry@wdl.lmco.com

27. Re: [SS:555] Where are the experimenters?

From: Richard Parry <rparry@qualcomm.com>
Date: Tue, 26 Nov 1996 14:58:09 -0800
To: ss@tapr.org
Message-ID: <v03007808aec1262c4d23@[129.46.159.136]>
Rendered body type: text/plain

I made similar comment a few weeks ago. I believe the answer is "watch the
TAPR Web Page" for the latest updates and how you can participate.

>In the two weeks since the TAPR STA was granted, there has barely been a
>peep out of this list. The current participating station list has about 25
>names on it and only a hand full have even posted here before: Greg,
>Dewayne, Steve B. and Steve S. and Jeff. Where are the others and what are
>they doing?
>
>Questions:
>
>I suspect the FW and WL code on the list indicates FreeWave and WaveLan

>based projects. True?
>
>Is there a commercial 5 watt amp that the FW crowd is looking at?
>
>Can anybody with 1 watt systems report sucesses with > 6dbi (non-stock)
>antennas?   What antennas?
>
>Thanks - Lee (AA0JP In the middle of Georgia!)
>See Part 15 SS Device Compendium at http://www.mindspring.com/~lfry/part15.htm
>Lee W. Fry
>lfry@wdl.lmco.com

Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
Globalstar/Gateway Reverse Link
Internal Web --> <http://qcwww/~rparry>
External Web --> <http://www.qualcomm.com/~rparry>
---

28. Re: [SS:556] Re: Where are the experimenters?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 26 Nov 1996 18:51:52 -0600
To: ss@tapr.org
Message-ID: <v03007804aec139bfc0ca@[128.83.113.90]>
Rendered body type: text/plain

Hi everyone. Been just to darn busy to really do anything other than try to get things rolling and organized -- not to count all the stuff for school and other projects that are happening at this end. When it rains it pours :-)

We started the process for the STA last April and we had about 4 days notice that the STA was going to be signed off on -- so, the first group were the people that had already been involved at the regional level with TAPR which seemed to be the quickest method to get the first people signed on. We had to submit a list and everyone had to be contacted and talked with. I didn't figure making an announcement on the list here or elsewhere would have been possible to handle in the short time we had to accomplish the paper work and hand it off to our lawyers in DC.

Just to let everyone know what happened -- two events happened in the last month that made the STA appear so rapidly. First, TAPR and our law firm in DC meet with the FCC regarding the STA and once it was moved up a rung or two we had positive momentum and an agreement that the STA was possible and should be issued. Just costs money for these personal meetings with lawyers attending. The second was that at the last ARRL BoD meeting, the league board voted that a letter be sent to the FCC which reflected positively on the STA we had been working towards. Dewayne and myself were very happy that the ARRL BoD took the time to take this action. Between moving the issue to a higher level at the FCC and the positive letter from the ARRL, the STA was on the go.

Now that we have the first group sem-organized and off the ground, the next step was to get the stations page information collected and into our database and I am now working on getting the Web application on-line and looked over before making that available.

Dewayne and myself see three levels of participation in the STA.
1. You have an experimental proposal you want to make to test something you are designing or have designed. We have two or three submitted in the first batch now based in Harris and the Loral stuff pending a little more work.
2. You have Existing Part 15 equipment that would like to operate under Part 97 for testing purposes. This is like the WaveLan stuff John Ackermann is doing in Ohio and I believe we will see others wanting to use this opportunity to operate under Part 97 and report on their activities.
3. You don't have anything available in 1 or 2 above, but you still want to participate -- so you can get one of the 900Mhz radios TAPR is going to be making available for testing and experimenting with under the STA. As many might have guessed -- they are Freewave. We are working a deal currently with Freewave and expect to be able to make a 1 watt, 902-928Mhz, hopper available with the RS-232 interface for around $399 with a metal case and supply. Probably announce this officially sometime in January after the beta-purchase is completed.

In this way, we can allow anyone who is a member of TAPR to be involved in some level of the STA.

As soon as the STA application is available I will post something here and

on tapr-bb. I would be really interested in hearing about any potential
experimental stuff not involved existing equipment. This type of work has
the potential for the most impact under the STA.

One of the areas that the ARRL Future Systems Committee expressed interest
in was to see if we can locate people interested in doing stuff on the
219/220 bands, since that band could provide some interesting utilization.

We have access to freqs from 50Mhz and up, so if you are an experimenter
this is your chance to take advantage of the possibility of testing stuff
on 2 meter and 6 meters as well as 220.

The clock is ticking. We should be able to add people to the STA starting
a little before Xmas. Still have to touch bases with Dewayne and our law
firm on the method and time for submitting changes on the STA.

Back to work.   I hope others will begin to dicuss and hopefully think
about ways to get exsiting SS chip sets on various bands in the short
period of time we now have.

Cheers - Greg, WD5IVD

>I made similar comment a few weeks ago. I believe the answer is "watch the
>TAPR Web Page" for the latest updates and how you can participate.
>
>
>>In the two weeks since the TAPR STA was granted, there has barely been a
>>peep out of this list. The current participating station list has about 25
>>names on it and only a hand full have even posted here before: Greg,
>>Dewayne, Steve B. and Steve S. and Jeff. Where are the others and what are
>>they doing?
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>>I suspect the FW and WL code on the list indicates FreeWave and WaveLan
>>based projects. True?
>>
>>Is there a commercial 5 watt amp that the FW crowd is looking at?
>>
>>Can anybody with 1 watt systems report sucesses with > 6dbi (non-stock)
>>antennas?   What antennas?
>>
>>Thanks - Lee (AA0JP In the middle of Georgia!)
>>See Part 15 SS Device Compendium at
>>http://www.mindspring.com/~lfry/part15.htm
>>Lee W. Fry
>>lfry@wdl.lmco.com
>
>
>---------------
>Richard Parry, P.E., W9IF - Ext 8-4972, Office R-307B
>Globalstar/Gateway Reverse Link
>Internal Web --> <http://qcwww/~rparry>
>External Web --> <http://www.qualcomm.com/~rparry>
>---------------

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

29. Re: [SS:555] Where are the experimenters?

From: Lyle Johnson <lylej@azstarnet.com>
Date: Tue, 26 Nov 1996 19:11:38 -0700 (MST)
To: ss@tapr.org
Message-ID: <1.5.4.32.19961126191317.003792a0@pop.azstarnet.com>
Rendered body type: text/plain

Lee,

At work I have just received the Harris 2.4 GHz "PRIMS" chipset eval module.
I hope to dig into this in the next several weeks It could form the basis
of a fast, CHEAP S-band SS rig...

Cheers,

Lyle

At 03:58 PM 11/26/96 -0600, you wrote:
>In the two weeks since the TAPR STA was granted, there has barely been a
>peep out of this list. The current participating station list has about 25
>names on it and only a hand full have even posted here before: Greg,
>Dewayne, Steve B. and Steve S. and Jeff. Where are the others and what are
>they doing?
>
>Questions:
>
>I suspect the FW and WL code on the list indicates FreeWave and WaveLan
>based projects. True?
>
>Is there a commercial 5 watt amp that the FW crowd is looking at?
>
>Can anybody with 1 watt systems report sucesses with > 6dbi (non-stock)
>antennas?   What antennas?
>
>Thanks - Lee (AA0JP In the middle of Georgia!)
>See Part 15 SS Device Compendium at http://www.mindspring.com/~lfry/part15.htm
>Lee W. Fry
>lfry@wdl.lmco.com
>
>

30. Re: [SS:557] Re: Where are the experimenters?

From: fperkins@onramp.net
Date: Tue, 26 Nov 1996 21:01:22 -0600 (CST)
To: ss@tapr.org
Message-ID: <199611270301.VAA01510@mailhost.onramp.net>
Rendered body type: text/plain

Hi Greg,

Is there a way to do a mass-STA sign-up for DSP-93 users :-)

73 Frank
WWWWWWWWWWWWWWBBBBBBBBBBBBBBB555555555555555IIIIIIIIIIIIIIIIIPPPPPPPPPPPMMMMMMMM

31. Re: [SS:559] Re: Where are the experimenters?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Tue, 26 Nov 1996 23:07:40 -0600
To: ss@tapr.org
Message-ID: <v0300780eaec17cee8c01@[128.83.113.90]>
Rendered body type: text/plain

Hi Frank.

When the application on the web site is available you can get as many
DSP-93 users signed up as you like -- who meet the requirements.

Maybe you can talk a little bit about the SS code you have running on the
DSP-93.

Cheers - Greg

>Hi Greg,
>
>Is there a way to do a mass-STA sign-up for DSP-93 users :-)
>
>
>73 Frank
>WWWWWWWWWWWWWWBBBBBBBBBBBBBBB555555555555555IIIIIIIIIIIIIIIIIPPPPPPPPPPPMMMMMMMM
>M

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

32. Re: Where are the experimenters?

From: "Lee W. Fry" <lfry@wdl.lmco.com>
Date: Wed, 27 Nov 1996 10:10:01 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961127151001.008d89f4@wdl1.wdl.lmco.com>
Rendered body type: text/plain

Many thanks to Greg for the detailed response in [SS:557]

Also thanks to all for not flaming me for the dumb question about the amp. Had I looked at the FreeWave entry on my web site, I would have seen that FreeWave also makes a mast mounted 5 watt bilateral amp.

I am worried about the timing of the open and close of any group buys and the availability of info about what is in the buy. What I am going to have to do here in Warner Robins, GA is deliver a serious pitch to the local club at a monthly meet to see if I can drum up interest from one or more other parties.

I think the first problem is going to be money timing. Budgeting $400 for a card, and possibly more for a high gain antenna, or an amp (any idea how much they will be?) might be a timing problem for some who might like to commit. More lead time, or an open ended buy period is better.

Geography (its pretty flat around here)and net topology will also be a major consideration. Technology selection will be driven by the locations of people interested in participating. The 115 Kbps FreeWave link offers a different set of possibilities than the 2Mbps WaveLans and similar devices by trading data bandwidth for system gain.

I am also not sure what people want to do around here either. I have only recently moved here and don't know a lot about what is going on. On packet, it looks like there is a 9600 SEDAN link into the area, but no 56Kbps GRAPES link in the area. I have no idea about ATV or SSTV.

My own interest is internet style TCP/IP out of my linux box.

So anyway, I guess I'll start working up a set of Powerpoint slides and make them available for comment here.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
http://www.mindspring.com/~lfry/part15.htm

33. Re: [SS:560] Re: Where are the experimenters?

From: fperkins@onramp.net
Date: Wed, 27 Nov 1996 10:49:12 -0600 (CST)
To: ss@tapr.org
Message-ID: <199611271649.KAA15019@mailhost.onramp.net>
Rendered body type: text/plain

Hi Greg and the SS gang.

Here is a DSSS demo in QuickBasic, source and DOS executable (run full screen).
Supersimple matched filter correlator; wrote code in 15 minutes.

Play with it if you want ... code is AS IS ... NO WARRANTY!!

Hit the q key or the enter key to exit.

  Top trace is 31 chip gold code

  Middle trace is correlator output.

  Bottom trace is recovered data.

We could maybe just send this code into the FCC for STA approval?? :-)

73 Frank

WWWWWWWWWWBBBBBBBBBBB5555555555IIIIIIIIIIPPPPPPPPPPPPPMMMMMMMMMMM

PS Greg - will call you this afternoon.

34. Re: [SS:561] Re: Where are the experimenters?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Wed, 27 Nov 1996 11:32:02 -0600

To: ss@tapr.org
Message-ID: <v0300780baec225ad2a24@[128.83.113.124]>
Rendered body type: text/plain

>Many thanks to Greg for the detailed response in [SS:557]
>
>I am worried about the timing of the open and close of any group buys and
>the availability of info about what is in the buy. What I am going to have
>to do here in Warner Robins, GA is deliver a serious pitch to the local club
>at a monthly meet to see if I can drum up interest from one or more other
>parties.

My guess right now is that we will be doing group buys at the end of every
month once we start until such time as that doesn't make sense. We have
been promised 3 week turn on production for the units we are getting. Then
we have about a 2-3 week turn on the enclosures we are going to be
providing. Comes out all about the same....take orders then plan on a 5
weeks from the deadline for delivery after that.

>I think the first problem is going to be money timing. Budgeting $400 for a
>card, and possibly more for a high gain antenna, or an amp (any idea how
>much they will be?) might be a timing problem for some who might like to
>commit. More lead time, or an open ended buy period is better.

Antennas are going to cost around $100 for a horz beam. LRM400 or better
starts at .56 a foot. We do have someone looking at maybe getting into the
building of antennas for just this project to help lower the overall cost.
Since a horz omni cost some money.

>My own interest is internet style TCP/IP out of my linux box.

That is what I am doing for the testing here. Everything I plan to use
over the Freewave boxes for the next bit is based on SLIP in and out at
115K. Think of the possibility for some mobiling IP stuff with decent
coverage if the sites are available.

>So anyway, I guess I'll start working up a set of Powerpoint slides and
>make them available for comment here.

I am sure that would be very handy. Jeff King, in Mich, can probably help
with this as well. I can envision that we might have several hundred
people using the STA before it is over doing all sorts of interesting
technology.

Cheers -- Greg, WD5IVD

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

35. Re: [SS:562] DSSS Demo

From: fperkins@onramp.net
Date: Wed, 27 Nov 1996 12:48:31 -0600 (CST)
To: ss@tapr.org
Message-ID: <199611271848.MAA16969@mailhost.onramp.net>
Rendered body type: text/plain

Sent to the TAPR group...

<---- Begin Forwarded Message ---->
From: fperkins@onramp.net
Subject: Re: [SS:562] DSSS Demo
To: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>

Hi again Greg and the SS gang,

Well, I was rushing out the door to meet my wife for lunch and I
overlooked attaching the demo code zip file ...

"Here is a DSSS demo in QuickBasic - source and executable. Run it full screen
if you are doing windows. Supersimple direct-sequence technique using a matched
filter type correlator.

  Top trace is a 31 chip gold code multiplied by a 101010... data sequence.

  Middle trace is the correlator output.

Bottom trace is the recovered 101010... data bits.

73s Again Frank

WWWWWWWWWWBBBBBBBBBB5555555555IIIIIIIIIIPPPPPPPPPPPPMMMMMMMMM

<---- End Forwarded Message ---->
[Attachment: SSDEMO.ZIP; application/octet-stream; 27,941 bytes]

36. Mongolian SS system featured on MSNBC

From: Steve Stroh <strohs@halcyon.com>
Date: Wed, 27 Nov 1996 11:42:38 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>
Cc: Dewayne Hendricks WA8DZP <dewayne@warpspeed.com>
Message-ID: <Pine.ULT.3.95.961127114040.22272A-100000@chinook.halcyon.com>
Rendered body type: text/plain

Check out http://www.msnbc.com/news/43414.asp for a story about the
SS-based Internet system that was recently installed in Mongolia.

Take a bow, Dewayne!

Steve N8GNJ

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

37. Re: [SS:562] DSSS Demo

From: fperkins@onramp.net (by way of Greg Jones, WD5IVD)
Date: Wed, 27 Nov 1996 13:43:32 -0600
To: " Spread Spectrum "<ss@tapr.org>
Message-ID: <v03007803aec24a566eb8@[128.83.113.80]>
Rendered body type: text/plain

Hi again Greg and the SS gang,

Well, I was rushing out the door to meet my wife for lunch and I
overlooked attaching the demo code zip file ...

"Here is a DSSS demo in QuickBasic - source and executable. Run it full screen
if you are doing windows. Supersimple direct-sequence technique using a matched
filter type correlator.

Top trace is a 31 chip gold code multiplied by a 101010... data sequence.

Middle trace is the correlator output.

Bottom trace is the recovered 101010... data bits.

73s Again Frank

WWWWWWWWWWBBBBBBBBBB5555555555IIIIIIIIIIPPPPPPPPPPPPMMMMMMMMM
[Attachment: SSDEMO.ZIP; application/zip; 27,941 bytes]

38. Antennas...

From: wb9mjn@wb9mjn.ampr.org
Date: Wed, 27 Nov 96 17:22:50 UTC
To: ss@tapr.org
Message-ID: <11422@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Greg, and others,

Is there experience with the Freewave boxes, that horizontal polarisation
is prefered? What i see in the Freewave literature is just a little vertical
stub antenna on one of the units, and mention of other antennas in the price
list, without any comment as to polarisation.

There are a variety of ways to make omni horizontal antennas. If u hook
up a QF helix, the wrong way, that s what u get. Untwisted, its two full wave
loops, fed parallel and 90 degree seperated in azimuth. The usual way to
get high gain horizontal omni antenna is the slot array, cut into the side
of a piece of waveguide. This is the UHF TV broadcast antenna, thats typical.
At 915 Mhz, this would be practical, altho more expensive than a vertical
colinear.

Yagi s do not provide good reliability at these frequencies and above. They not only dephase in weather, but detune. This double whamy of loss of gain, and loss of power radiated, will usually zap a path completely. A Corner Reflector is better. It does not loose gain in weather, only detunes a small amount. Corner Reflectors are big and bulky , however, and if the reflector is not welded, it will be prone to the "scratchies".

Commercial Wireless organisations have been using Microstrip antennas for some years now. Take a look at the local cell site, and you will probably see a 1 to 2 inch thick panel antenna up there. The reasons for this are the reliability in weather, and lesser amount of interaction such antennas have with each other. Additionally, array antennas built up from Microstrip Patches have fewer problems with mutual impedance (element coupling).

I ve some experience in engineering UHF Microstrip antennas, and plan on doing a 915 Mhz antenna. This message is being sent over a 440 panel antenna. In my situation the multipath, which would manifest itself as a delay spread problem with the Freewave radios, due to operating out of building led me to the Microstrip antenna solution. The high F/B ration of the antenna helps dramatically with the multipath. Recently, the http://www.baltzer.nl/wireless page was referenced in the news group. In the www.baltzer.nl/wireless/delayspr.htm section of that page, its reported that indoor antennas see much greater delay spreads, on the order of 10 times over that of suburban areas.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

39. Re: [SS:567] Antennas...

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Thu, 28 Nov 1996 08:52:36 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961128135236.00312860@mindspring.com>
Rendered body type: text/plain

At 05:53 PM 11/27/96 -0600, Don wrote:

(snip)
>Recently, the http://www.baltzer.nl/wireless page was referenced in the news >group.
(snip)

The page is now http://www.baltzer.nl/wirelesscd/cd.html and the page of interest is http://www.baltzer.nl/wirelesscd/delayspr.htm.
Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
http://www.mindspring.com/~lfry/part15.htm

40. Re: [SS:568] Re: Antennas...

From: wb9mjn@wb9mjn.ampr.org
Date: Thu, 28 Nov 96 10:36:40 UTC
To: ss@tapr.org
Message-ID: <11427@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Lee,

Thanks for the correction!

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

41. while on the subject of antennas - double rhombic.

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Thu, 28 Nov 1996 13:25:27 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.961128131718.13589A-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi Guys:

It was pointed out to me that the winner of this year's central states
VHF conference entered with a 1296 double rhombic (with 17.3 dbi gain).

Even a little bit larger, this double rhombic doesn't look as huge (and
much more visualy pleasing) as the 33 element loop yagi that I plan to
install at the condo.

Do any of you know where he got the construction plans from?

Bernie

42. lets try again... Re: Antennas and 1296 double rhombic.

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Thu, 28 Nov 1996 16:30:31 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.961128161524.14344A-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi again:

Many apologies for the bad grammar in my last email. Lets try again:

It was pointed out to me that the winner of this year's central states
VHF conference won with a 1296 MHz. double rhombic (with 17.3 dbi gain).

I would like to build a scaled up version of this double rhombic for 900
MHz, since it has roughly the gain of my 33 element loop yagi, but with
much lower visual impact (I live in a condo and have to be careful with
the amount of aluminum I put up).

Does anyone know where Daylon Johnson (the winner) got the design from?
Is it in the VHF Compendium? Before any wise guys out there tell me to just
scale an HF rhombic to 900 MHz, let me emphasize that I am looking for the
exact apex angle, and other physical dimensions of this antenna, so that
I can reproduce it (but scaled up for 900 MHz.).

I believe that he did some optimization to get it to work so well at
1296 and I don't want to have to repeat these optimizations if they are
available somewhere.

Best Regards and Happy Thanksgiving!

Bernie nu1s

43. Rhombic

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Thu, 28 Nov 1996 17:38:39 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961128223839.00300ed4@mindspring.com>
Rendered body type: text/plain

FWIW,there is a picture of Johnson and his dual rhombic on page 90 of this
month's (December) QST.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
http://www.mindspring.com/~lfry/part15.htm

44. Re: [SS:572] Rhombic

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 29 Nov 96 09:13:27 UTC
To: ss@tapr.org
Message-ID: <11433@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Bernie and Lee,

 Rhombics do have large side lobes. Each wire in the rhombic has 4 lobes. In
the rhombic design, the attempt is to null, add and absorb currents causing
the various lobes. This can be tricky, and altho good gain can be had, its
not a very good antenna for multipath rejection.

 Its also a quite large antenna, and that 3 dimensional bulk needs to be
out there cantelevered in free space. A 5 lamba per wire Rhombic, is going
to need a 10 lambda, by 5 lambda space. Multiply that by two for a dual Rhom-

bic. A 10 lambda on 915 Mhz is 11 feet, and the antenna requires an cube of this dimension. Oops, half a cube of this dimension. □□

  This seems like a better antenna for a farm silo instatllation, on a prarie, than a condo/apartment antenna in a multipath enviorment of an urban space, on 900 Mhz. Altho, a large panel of such antennas on 10 Ghz is an intriguing idea. And it might be a good design for DSS TVRO.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

45. unsubscribe

From: Derrick Kim <cdk1@sprynet.com>
Date: Fri, 29 Nov 1996 09:24:57 -0800
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBDDD7.436ACB00@ad46-182.compuserve.com>
Rendered body type: text/plain

Please take me off the SS mailing list. Thanks.

Derrick

46. SS below 70cm?

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sat, 30 Nov 1996 07:32:48 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961130123248.0032a9ec@mindspring.com>
Rendered body type: text/plain

The announcement of the approval of the TAPR STA initiated a heated discussion on the VHF reflector about the possible consequnces on EME and weak signal work. The discussion has largely died down, except for some on-going discussion Greg is having about a request for participing stations to post daily operating summaries. I think all involved in the STA want to go about it in such a way as to enable any impact to be evaluated. However, to evaluate impact on 2 meter EME work, or 6 meter, there has to be somebody operating SS in those bands. All I see in the initial list of stations in the STA is 900 MHz. I'm worried that based on the lack of off-the-shelf equipment that there won't be enough stations involved on anything but 900Mhz and 2.4 Ghz to determine very much.

However, I'm wondering if SS is already there and they don't know it. The Army and Marine Corps have thousands of SINCGARS radios which operate from 30MHz to 88MHz and as near as I can tell have some sort of frequency diversity mode (SS? - Maybe someone here knows what kind?). We know the military sometimes uses their ability to operate in the 6m ham bands - last summer war games were heard by 6m operators here in the CONUS. So how much are they doing that we don't hear?

Another example is the AN/PRC-117 which has FHSS on 30 - 90, 116 - 174, and 225 - 420 MHz. Don't know how many of those are around, but probably a lot more than there will be stations under this STA.

On 900 there has been a rise in the "noise floor". 900 is where the bulk of commercial exploitation is going on, probably mostly wireless phones, only some of which are SS. At least there is enough happening there that operators can quantify it as a "n" db increase in the noise floor in their area.

I guess my real question is how big an amateur community will be required to add anything measurable to either the military or the commercial "noise floor" on any band? I doubt we will add much to what the military is doing on bands where there is no commercial activity and any thing we would add will certainly be swamped out on bands where there is.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
http://www.mindspring.com/~lfry/part15.htm

47. Re: [SS:575] SS below 70cm?

From: Sjolin@aol.com
Date: Sat, 30 Nov 1996 09:09:25 -0500
To: ss@tapr.org

Message-ID: <961130090924_772886871@emout06.mail.aol.com>
Rendered body type: text/plain

In a message dated 96-11-30 08:01:55 EST, you write:

<< I think all involved in the STA want to
 go about it in such a way as to enable any impact to be evaluated. However,
 to evaluate impact on 2 meter EME work, or 6 meter, there has to be somebody
 operating SS in those bands. All I see in the initial list of stations in
 the STA is 900 MHz. I'm worried that based on the lack of off-the-shelf
 equipment that there won't be enough stations involved on anything but
 900Mhz and 2.4 Ghz to determine very much. >>

I thought a major purpose of STA was to evaluate impact on other users of
bands where SS is not currently allowed. I hope TAPR doesn't plan on using
results from 900 mhz to infer what might be the impact on two meter weak
signal operations?

<< I guess my real question is how big an amateur community will be required
to
 add anything measurable to either the military or the commercial "noise
 floor" on any band? I doubt we will add much to what the military is doing
 on bands where there is no commercial activity and any thing we would add
 will certainly be swamped out on bands where there is. >>

Not all of us live near a military base, particularly one where widespread
usage of VHF/UHF SS for normal military traffic. Is there commercial spread
spectrum currently in/close to the two meter and 70 cm bands?

73 de Dave, N0IT

48. Re: [SS:575] SS below 70cm?

From: Steve Stroh <strohs@halcyon.com>
Date: Sat, 30 Nov 1996 06:59:58 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.ULT.3.95.961130065046.13985D-100000@coho.halcyon.com>
Rendered body type: text/plain

On Sat, 30 Nov 1996, Lee W. Fry wrote:

<snip>

> However,
> to evaluate impact on 2 meter EME work, or 6 meter, there has to be somebody
> operating SS in those bands. All I see in the initial list of stations in
> the STA is 900 MHz. I'm worried that based on the lack of off-the-shelf
> equipment that there won't be enough stations involved on anything but
> 900Mhz and 2.4 Ghz to determine very much.

I'm speaking for myself with this next- the "official" opinions will no
doubt weigh in shortly.

The STA gives us the ability to use existing commercial 902-928 MHz SS
equipment. It also gives us the ability to do SS on all Amateur bands
above 50 MHz. The immediate effect of the STA will be to get SS units of
some kind into hands that had NO experience with it previously. They'll
see what they like about it, what they don't like, things Amateurs could
do better, networking techniques, etc. This will grow the amount of
Amateur Radio experience and expertise with SS exponentially over what we
have at the moment.

Steve N8GNJ

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

49. Re: [SS:575] SS below 70cm?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sat, 30 Nov 1996 10:19:00 -0600
To: ss@tapr.org
Message-ID: <v03007817aec60aa9dd7e@[129.120.111.42]>
Rendered body type: text/plain

>I guess my real question is how big an amateur community will be required to
>add anything measurable to either the military or the commercial "noise

>floor" on any band? I doubt we will add much to what the military is doing
>on bands where there is no commercial activity and any thing we would add
>will certainly be swamped out on bands where there is.

I think you hit the nail on the head. I don't see 3 million amateurs every doing anything on 6, 220, or 2 for sometime to come. The debate that Phil Karn and Robert Carpenter had this summer ran about the same lines. It boils down to that if someone designs bad equipment -- no matter if it is SS or some other mode, it will probably interfere with someone or something. The clue is to build equipment that does not. The technology exist to do it....but the detractors will want to somehow stop you from trying. Ever forward! :-)

Frank Perkins posted an example of generating a DS signal using a DSP. While the DSP-93 could not generate a really wide DS signal, what engines are currently out there that this code could be ported to that would do the trick ? Then what would the interface between the DSP and radio be ? Then can someone build up a radio for 2 or 6 meters that would allow a 1 meg wide or wider signal to be present ? Those are all answerable questions. Maybe someone can being up the DSP issues over on the DSP@tapr.org list.

As to the military radios already on our bands most likely doing SS. Have you not noticed that anything done outside of amateur radio doesn't count in most hams book. It has to be done by hams for it to count in the real world :-)

I hope we can find some ways to get equipment and operations on the other bands we have access to under the STA. Under the Buass STA there was little operations in the bands available under that STA. I never got a full count from Bob on his STA, but he never did have a lot of people sign up. We hope that TAPR having an STA will get a larger group of people involved so that something might turn up which the entire STA can take advantage of. The reason you see 900Mhz on most of the list, is because as you pointed out, equipment can be had and gotten on the band. It is important to have something on the air and testing while the harder areas are worked on. We would hate to go to all this trouble to get the STA to then do nothing with it before the end of 6 months. That would be a good way of not having any chance at an extension.

A lot of the designs that people have shown me for doing SS work under Part 97 use existing RF modules on 900, 2.4, and 5 gigs. It still comes down to fact that amateurs can do digital a lot easier than RF. When RF modules are available for the 3 part 15 bands, certainly amateurs are going to try to use them. One reason the 2-meter repeater explosion happened -- the availability of inexpensive landmobile radios for repeaters. We are going to need to start using some of the new RF technology that is being made available now to design amateur radios that can be used with wideband digital modulations for 6,2,and 220 if we really want to make sure we are operating on our amateur bands.

I think the conversation over on the VHF list is about over for me. The same issues, which I will not be able to every provide a suitable answer or argument for, are turning back up. Time to focus on things I can change and effect.

Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

50. Re: [SS:575] SS below 70cm?

From: wb9mjn@wb9mjn.ampr.org
Date: Sat, 30 Nov 96 10:09:53 UTC
To: ss@tapr.org
Message-ID: <11441@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Lee, Steve and Dave,

  On 6 meter EME, I ve only heard of one person who had accomplished this, and he was using the resources of a government funded research group. He had a large field of fixed yagis, and when the moon came across the boresite of the array, he did EME for grins.

  Consequently, 6 meter EME intereferance is really a non-issue. Let alone the

channel 2 problem.

  2 meter and 70 cm interferance could be a problem. These are the two most used EME bands. 70 cm is a very good band for eme.

  900 Mhz is a non-issue too. The ham SS would just be a small addition to the existing commercial licensed, and unlicensed activity. Of which the licensed activity has priority over ham radio in this band.

  2.4 Ghz is an issue. This is the best space communications band available to Hams. But, due to terrain absorbtion, and antenna directivity, it should be workable. The moon is rarely on the horizon. And an upward pointed EME array will really do a wamy on any 1 watt DSSS signals. FHSS can be programmed to avoid the EME spectrum altogether.

  The DDMA-WAN idea would avoid the azimuth's of EME stations, simply because during transmission, the EME station would create a high BER. And the azimuthal based routing, would go around such stations. This would make a 13 or dB reduction in signal, in addition to the EME array reduction.

  I guess the best advice for EME's is to do it "right". That is, design antennas primarily for off boresite rejection of signals. SS is not the only terrestrial noise source, anyway. Blowing up about SS, is stupid, when there is so much other noise out there. Especially from power poles, cars and consumer computing/entertainment devices, and compact florescent lighting, and power factor controllers, and and and...

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

51. Re: [SS:578] Re: SS below 70cm?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sat, 30 Nov 1996 11:48:38 -0600
To: ss@tapr.org
Message-ID: <v0300781caec6232ea3f7@[129.120.111.42]>
Rendered body type: text/plain

>Frank Perkins posted an example of generating a DS signal using a DSP.
>While the DSP-93 could not generate a really wide DS signal, what engines
>are currently out there that this code could be ported to that would do the
>trick ? Then what would the interface between the DSP and radio be ? Then
>can someone build up a radio for 2 or 6 meters that would allow a 1 meg
>wide or wider signal to be present ? Those are all answerable questions.
>Maybe someone can being up the DSP issues over on the DSP@tapr.org list.

I forgot to add that Phil Karn has something running on PC that would probably do the same trick. Maybe not DS, but some interesting stuff. At the ARRL Future Systems Committee in Seattle there was discussion of building an RF module that would interface to what Phil was wanting to code on his PC. This might be another solution to get a number of people operating on other bands.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

52. Re: [SS:575] SS below 70cm?

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Sat, 30 Nov 1996 22:33:05 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19961201033305.006979b4@gnatnet.net>
Rendered body type: text/plain

>However, I'm wondering if SS is already there and they don't know it. The
>Army and Marine Corps have thousands of SINCGARS radios which operate from
>30MHz to 88MHz and as near as I can tell have some sort of frequency

SINGARS is a Frequency Hopping voice mode radio that the Army and Marines later adapted to include digital transmission.

- Steve, N7HPR
(n7hpr@tapr.org)

53. Re: [SS:581] Re: SS below 70cm?

From: George Cserenyi <zsolt@direct.ca>
Date: Sat, 30 Nov 1996 21:38:00 -0800 (PST)
To: "Steven R. Bible" <srbible@gnatnet.net>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.91.961130213651.13018C-100000@boxer.direct.ca>
Rendered body type: text/plain

How frequently does it hop and how far?
George

On Sat, 30 Nov 1996, Steven R. Bible wrote:

>
> >However, I'm wondering if SS is already there and they don't know it. The
> >Army and Marine Corps have thousands of SINCGARS radios which operate from
> >30MHz to 88MHz and as near as I can tell have some sort of frequency
>
> SINGARS is a Frequency Hopping voice mode radio that the Army and Marines
> later adapted to include digital transmission.
>
> - Steve, N7HPR
> (n7hpr@tapr.org)
>
>

December 1996

Original source file: ss.9612
Source: http://ftp.tapr.org/tapr_history/SIG_Archives/spread-spectrum-sig/mail_archive/ss.9612

1. SS on 2m

From: Dirk-Jan Koopman <djk@tobit.co.uk>
Date: Sun, 1 Dec 1996 15:42:30 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.93.961201152831.21735H-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

Hi,

I shall be pointing out to our 'authorities' that you now have your STA,
hopefully this will mean that we will get ours RSN...

In the meantime, perhaps some thought might go into a use for SS on 2m.
As you may know there is a prize for the first 2way comms between the US
and Europe (or it might just be GB, can't remember exactly). It seems to
me (as a non-dxer) that the lazy way to establish paths is to get
computers to sit there on a 'channel' and squirt 'packets' at each other.

What would be the processing gain available for a 50 or 100 bps signal
spread to 2Mhz (we don't have 4Mhz on 2m)? Would I be right in thinking
this is > 40db? One could easily avoid the EME section. If it were
demonstrated to work, I wonder how long it would be before the EME boys
would be demanding SS STAs, after all 40db would make their link budgets
look like local vhf comms. Who needs satellites? (well man-made ones
anyway?)

An idea might be each station sends a packet (a tuple of callsign and
locator) at specified times (under GPS control?) and if heard it is
immediately returned with the tuple of the receiving station and if that
is heard then it is returned again with a flag at the end (eg K) for the
three way handshake. Stick a couple of kilowatts on for a bit extra
umph into a very long yagi (there is lose talk of 100 ele aerials) and ...

Any views? Shall I start building? Whadayasay?

--
Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

2. Re: [SS:583] SS on 2m

From: "Dale Heatherington" <wa4dsy@wa4dsy.radio.org>
Date: Sun, 01 Dec 96 13:49:23
To: "ss@tapr.org" <ss@tapr.org>
Message-ID: <m0vUGxE-0001LVC@wa4mei.radio.org>
Rendered body type: text/plain

On Sun, 1 Dec 1996 09:46:22 -0600 (CST), Dirk-Jan Koopman wrote:

>What would be the processing gain available for a 50 or 100 bps signal
>spread to 2Mhz (we don't have 4Mhz on 2m)? Would I be right in thinking
>this is > 40db? One could easily avoid the EME section. If it were
>demonstrated to work, I wonder how long it would be before the EME boys
>would be demanding SS STAs, after all 40db would make their link budgets
>look like local vhf comms. Who needs satellites? (well man-made ones
>anyway?)

Thats 40 db over what it would be if the information part of the signal
was 2 mhz wide. There is no real power gain in sending 100 baud
PSK with 1 watt vs spreading it over 2 mhz with one watt. Path loss is the same.

Dale Heatherington, WA4DSY
e-mail - wa4dsy@wa4dsy.radio.org
e-mail - daheath@ibm.net (in case the first one doesn't work)
Web page - http://www.wa4dsy.radio.org
This message brought to you by OS/2 Warp v4

3. Re: [SS:584] Re: SS on 2m

From: Dave Koberstein <davek@komacke.com>
Date: Sun, 01 Dec 1996 11:59:41 -0800
To: ss@tapr.org
Message-ID: <3.0.32.19961201115918.0069bc74@sydney>
Rendered body type: text/plain

At 12:51 PM 12/1/96 -0600, you wrote:
>On Sun, 1 Dec 1996 09:46:22 -0600 (CST), Dirk-Jan Koopman wrote:
> -- (snip) --
>>this is > 40db? One could easily avoid the EME section. If it were
>>demonstrated to work, I wonder how long it would be before the EME boys
>>would be demanding SS STAs, after all 40db would make their link budgets
>>look like local vhf comms. Who needs satellites? (well man-made ones
>>anyway?)
>
>Thats 40 db over what it would be if the information part of the signal
>was 2 mhz wide. There is no real power gain in sending 100 baud
>PSK with 1 watt vs spreading it over 2 mhz with one watt. Path loss is
the same.
> -------------------- End of Original ---------------------------------

Processing gain doesn't help with your signal-to-thermal-noise ratio.
That's a subtle point that many people miss and is probably worth explaining.

Think of the de-spreading of a DSSS signal on receive as doing two things:
  1) takes the energy of the spread signal of interest and pulls it back into
     the original narrow bandwidth
  2) takes everything else (that's not correlated with the spreading code) and
     spreads it out evenly across the original spreading bandwidth

Given point #2, if you have a strong narrow band interfering signal in the
middle of your band of interest, the despreading will spread that
interfering signal across the original band. This gives you "processing
gain" with respect to that interfering signal over what you would have had
if you didn't use DSSS in the first place.

Interestingly, DSSS actually reduces your S/N slightly in the case where
that interfering signal would not have been on top of your narrow band
signal, had you not used DSSS. Using DSSS, the interferer is "spread" in
the receiver by the despreading function and you actually get energy in
your IF that you wouldn't have had otherwise.

However, if your interfering signal is just thermal noise, atmospheric
noise, or even another DSSS signal that is spread completely across your
band of interest, the despreading will just "respread" that interfering
signal across the same bandwidth. This gives you no advantage compared to
sending your signal unspread in the first place.

In the EME example, the background noise is there whether it's respread or
not. If you have a S/N of 10 dB without DSSS, you'll still have a S/N of
10 dB after going through the spreading/despreading functions of DSSS.

Hope that made sense.

Davek

_____
Dave Koberstein
  work: davek@proxim.com / http://www.proxim.com
  keep in touch: davek@komacke.com / http://www.komacke.com
  ham internet: n9dk@n9dk.ampr.org [44.4.12.172]
   (ax.25/PBBS: n9dk@w6yx.#nocal.ca.usa.noam)

4. Re: [SS:582] Re: SS below 70cm?

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sun, 01 Dec 1996 18:32:11 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961201233211.00313390@mindspring.com>
Rendered body type: text/plain

At 10:37 PM 11/30/96 -0600, George wrote [about SINCGARS]:
>
>How frequently does it hop and how far?

Don't know. Found an interesting reference to the front end design at
http://www2.nova-eng.com/nova/sincgars.html.

A general description of the radio is at
http://www.polaris.net/~gdls/sincgar.htm.

http://www.monmouth.army.mil/cecom/lrc/comm/tradio/sincloap/mode.html has a
reference to a mode switch for a FH net master mode which electronically
maintains all net radios within the plus or minus 4 second window required for
frequency hopping communications.

Anybody have any ideas about how to recognize that a FHSS or DSSS system is
sharing spectrum with you? There is a picture from a spectrum analyzer at
http://www.lxe.com/radio.htm showing 900MHz showing DSSS and FHSS on the
same display. If we were going to look for the presence of uncooperating
(uncooperating meaning we don't know for sure they are there or what
frequencies they are on) military emitters on 2M, 220, or 440 how would we
go about it? I don't suppose that SS is called low probability of detection
for nothing.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
http://www.mindspring.com/~lfry/part15.htm

5. $200 SS

From: Daniel JB Clark <dclark@pobox.com>
Date: Sun, 01 Dec 1996 18:50:03 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.95.961201184819.19135A-100000@rn1645.resnet.oberlin.edu>
Rendered body type: text/plain

I just read this via usenet:

You should be aware there was just a group buy off one of the TAPR
SIG groups (SS@tapr.org). A 2megabit SS transciever for $200.

I reilize this deal is probably long over, but I'd be interested in the
manufacturer and model number of this equipment.

Thanks and 73.

--
==
    Daniel JB Clark | dclark@pobox.com | sdc8711@oberlin.edu
==
"cow" on Free Internet | lifetime email aliases | Internet Service Provider:
Chess Server: telnet | http://pobox.com/pobox/| Oberlin College ResNet
fics.onenet.net 5000 | finger @pobox.com | http://www.oberlin.edu
==

6. Re: $200 SS

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Sun, 1 Dec 1996 21:23:34 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612020523.VAA19889@wireless.net>
Rendered body type: text/plain

Daniel--

The $200 SS was a group buy I organized of AT&T (now Lucent) (in the
Netherlands) WaveLAN 915 MHz ISA cards. Limited stock, one-time buy.
Drivers available for various OS's (DOS, Windoz, UNIX). See
http://wavelan.com for more info, or email me directly.

best regards/bob K6KGS

7. some questions

From: Dirk-Jan Koopman <djk@tobit.co.uk>
Date: Mon, 2 Dec 1996 12:09:33 +0000 (GMT)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.93.961202115713.318D-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

Hi,

Further to my recent post (thanks for the info - back to coherent CW
-sigh), I have some more questions:-

1. What is the performance of a DSSS system such as is now commercially
available in the presence of doppler shift @ 2.4 GHZ (only thing available

here in GB). What I am wondering about is things carrying such devices at
closing and leaving speeds at maybe upto 400mph. Please assume the aerial
is at the worst possible place i.e. next to the line of travel.

2. Using 10-50mW (only) is it really possible to have a number of units
transmitting at once with different spreading codes centred on the same
freq in close proximity (say small nos of feet apart) (@ speeds of no more
than a few fps :-).

3. What is the average delay thru a typical system?

Dirk

--
Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

8. [SS:578] Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Mon, 2 Dec 96 12:22:44 +0000
To: ss@tapr.org
Message-ID: <H000029202e59a62@MHS>
Rendered body type: text/plain

> A lot of the designs that people have shown me for doing SS work under
> Part 97 use existing RF modules on 900, 2.4, and 5 gigs. It still
> comes down to fact that amateurs can do digital a lot easier than RF.
> When RF modules are available for the 3 part 15 bands, certainly
> amateurs are going to try to use them. One reason the 2-meter
> repeater explosion happened -- the availability of inexpensive
> landmobile radios for repeaters. We are going to need to start using
> some of the new RF technology that is being made available now to
> design amateur radios that can be used with wideband digital
> modulations for 6,2,and 220 if we really want to make sure we are
> operating on our amateur bands.

Lets get out of the 2m mentality, that's old and already spoken for
technology, the 2.4 and 5 GHz folks are on the right track.

It does baffle me a bit that people would actually want to promote SS on
bands below 70cm, or even 70cm itself. There are many technical problems
relating to interference resistance and band sharing. These bands are
already heavilly used (depending upon your definition of use,
educational, simplicity, installed equipment, etc, not just user bits
per Hz), there is no readilly avaliable equipment, there is very little
bandwidth, and there is the obvious political agro from those who
already use the band, and exploit the low noise floor for DX and EME, or
the simplicity of FM for cheap, power efficent hand helds, or what ever.

RF at 23cm and up to 4GHz is pretty easy if you have a reasonable PCB
and SMD components. IC's and modules are widely avaliable and cheap for
these frequencies. High gains and directionality are possible from small
yagi's and cheap dishes.

One of the most compelling reasons for going for microwave bands is the
old argument "use them or loose them". They are already under threat
from local loop service providers and will soon be under threat from ISP
WAN's. Once these bands were technological wastelands, allocated to
amateurs because nobody else wanted them, to see if amateurs could find
a use for them. Well, we haven't, but commercial interests have. The
only way we can justify retaining the 100's of MHZ we have available up
there is to use make use of the same technology the comercial folks are
using. The only use capable of justifying the allocation of these bands
is high speed data networks, ie SS WANs with at least 128kbps access and
point to point links in the 2-10 Mbps range. This is the only
way to competitively fill the bandwidth. There can be no doubt that the
demand for such an amateur service exists and will grow dramatically in
the next few years. This is the future of amateur radio, and it will
never fit on 70cm or below, so why step on someone else's toes? It would
be a sad day for amateur radio if we were to loose these bands and this
oppertunity because of infighting over bands that cannot support our
future anyway, just because supposed 'radio' enthusiests are afraid of
the Giga word!

The SS comunity claims to be (and should be) pushing the frontiers of
technology, so why on earth restrict yourself to ancient VHF RF
technology and then take the heat for not being compatible with the old

technology you are using!

Microwave is EASIER! The technology exists, modules exist, high gain antennas are cheap and small, and you don't need to worry about the interference caused by uncontrolled high power narrow band transmissions or worry about the interference you may cause them. SS relies on a well controlled short link network structure to be efficent, and needs a wide bandwidth if competitive data rates are to be achieved with frequency reuse and interference rejection. One high power narrow band user in your simple DSSS pass band can cause you to loose the capacity of many SS stations, and many narrow band stations makes hopping, chanalizing, notching etc a technical dificulity that could be almost completely ovoided by using microwave frequencies, while still leaving heaps of spectrum clear for narrow band users. Hi gain antennas allow much lower power (simpler PA's), and much greater rejection of interference from other SS stations and non-amateur interferers, as well as multipath all of which reduces capacity and throughput speed.

One single SS link at a distance may well be below the noise floor, but any half decent SS WAN with a hundred users (maybe thousands if the SS network can really prove itself to be competitive with the ISP's), that makes full use of the available spectrum MUST be above the noise floor, if it's not then capacity is being wasted, and we could loose the spectrum, or at least have to share it with the ISP's, and that will really restrict amateur advancements. Exclusive amateur SS allocations in the microwave bands is the only way amateur SS can really achieve its

massive potential. If technically inclined internet users could access the net via radio from home, and have a chance to play with (and learn about) the equipemnt and get cheap, independent access, then amateur radio would become the IN thing again, and TAPR can promote this! Few serious comminucations oriented technical people are interested in the pathetic early 80's technology we have today.

900Mhz is a good start, but you should be looking to go up, and expand, rather than go lower and face restrictions and concern from all quarters. Make a good systemn that people will want to use that does nobody out of their other interests and SS will be a winner, make enemies and SS will loose through lack of support and loss of essential bandwidth, and so will amateur radio.

Rob

9. [SS:583] SS on 2m

From: Robert.Glassey@nmp.nokia.com
Date: Mon, 2 Dec 96 13:08:10 +0000
To: ss@tapr.org
Message-ID: <H000029202e59a76@MHS>
Rendered body type: text/plain

> What would be the processing gain available for a 50 or 100 bps signal
> spread to 2Mhz (we don't have 4Mhz on 2m)? Would I be right in
> thinking this is > 40db? One could easily avoid the EME section. If it
> were demonstrated to work, I wonder how long it would be before the
> EME boys would be demanding SS STAs, after all 40db would make their
> link budgets look like local vhf comms. Who needs satellites? (well
> man-made ones anyway?)

Err, the 40dB processing 'gain' is more of an interference rejection of 40dB. The gain does take a signal in the noise floor and make it 40dB above the noise, but it is a complimentary process that assumes that you have already spread your signal out, and thereby loosing 40dB. Overall gain=0.

Using SS will not gain you 40dB of overall system performance, but will allow 40dB rejection of the sum total of all other stations in the spreading bandwidth, including multipath. (note that a 1 Watt 2m handheld say 1km away, would be 30dB stronger than a 100mW SS transmitter 10kM away, and anyone serious about networking would want at least 100 times more than 100bps (loosing 20dB) SS networks on 2m would be very challanging and ultimatly very complex for the poor performance they would offer, then there's the politics...)

SS gives you frequency diversity as well, but I'm not sure if that would help on a VHF path over the atlantic.

SS will allow you use much slower data rates than you would be able to do with a single carrier, since channel variations are less critical. This is where you would gain, if you could send say one bit every 10

seconds you would have a true gain of 30dB over a 100bps system. The problems then becomes long term variations, the troppo or whatever might only be present for a few seconds at a time, so your full packet would need to be over in that time, limiting the gain to be had here. Then there's sync problems of a SS sequence if a packet is only a few seconds long with a high processing 'gain'.

Interference wise, if you keep away from built up areas, have a good F/B ratio, and pointed your antenna out to sea, nobody would probably notice.

Rob

10. Re: [SS:555] Where are the experimenters?

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Mon, 2 Dec 1996 07:17:15 -0800
To: ss@tapr.org
Message-ID: <v03010915aec8a22cd3f1@[204.118.182.22]>
Rendered body type: text/plain

At 3:58 PM -0600 11/26/96, Lee W. Fry wrote:
>In the two weeks since the TAPR STA was granted, there has barely been a
>peep out of this list. The current participating station list has about 25
>names on it and only a hand full have even posted here before: Greg,
>Dewayne, Steve B. and Steve S. and Jeff. Where are the others and what are
>they doing?
>
        One reason that you're not hearing anything is that most STA activity has moved over to the new SS-STA list. There has been lots of discussion there as compared to this list of late.

>Questions:
>
>I suspect the FW and WL code on the list indicates FreeWave and WaveLan
>based projects. True?
>
        True!

>Is there a commercial 5 watt amp that the FW crowd is looking at?
>
        I have been using a 5 watt unit from FreeWave. It costs about $650. You can find out more about it at their website: <http://www.freewave.com/>. I have gotten good results with it, but find that for most links that I have had to put up, 1 watt does just fine. At the $650 price point, I doubt that most hams would consider the FW unit.

>Can anybody with 1 watt systems report sucesses with > 6dbi (non-stock)
>antennas?   What antennas?
>
        I have been having good success with a number of different antennas. You can find more info on what I've been doing with Part 15 stuff at: <http://wireless.oldcolo.com/>.

-- Dewayne

--
~~~~~~
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854   !
~~~~~~

11. Re: [SS:589] some questions

From: "NIKOS J. FARSARIS" <njf@lissos.tsinet.gr>
Date: Mon, 02 Dec 1996 17:25:08 -0200
To: ss@tapr.org
Message-ID: <32A32D14.50FF@lissos.tsinet.gr>
Rendered body type: text/plain

Dirk-Jan Koopman wrote:

> 2. Using 10-50mW (only) is it really possible to have a number of units
> transmitting at once with different spreading codes centred on the same
> freq in close proximity (say small nos of feet apart) (@ speeds of no more
> than a few fps :-).

Dear Dirk-Jan,

Would you explain me this question again ?? (Ithink I have the answer
as regards the ""different spreading codes centred on the same freq in
close
proximity "") but may be a Spatial Diversity (multistatic) is a
sollution!

--
NIKOS J. FARSARIS,   Dipl. Elec. Eng., Ph.D. Candidate A.U.TH.
RADAR / RF Research,TELECOMMUNICATION SYSTEMS INSTITUTE OF CRETE
(T.S.I.)
37 Iroon Polytechneiou Ave,73133 CHANIA CRETE GREECE
Tel: 30-821-28457/28423 Fax: 28459 E-mail: njf@tsinet.gr, njf@ee.auth.gr

12. Unsubscribe

From: Kreblon@ccwf.cc.utexas.edu (Bob Nagy)
Date: Mon, 2 Dec 1996 11:12:38 -0600 (CST)
To: ss@tapr.org
Message-ID: <199612021712.LAA27389@piglet.cc.utexas.edu>
Rendered body type: text/plain

Could you un-subscribe me from this list?

Thanks
Bob Nagy

****
Bob Nagy-AA5PB- Chief Engineer KVRX 91.7 / KVR TV9
Nagy's "Down Home" Page-
http://bluebonnet.pai.utexas.edu/Facstaff/stfpages/bnagy/
Daily word: " Osszi levelek" -Autumn Leaves- in Hungarian
****

13. Re: [SS:579] Re: SS below 70cm?

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Mon, 2 Dec 1996 09:39:28 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612021739.AA115068369@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Don wrote:

>   On 6 meter EME, I ve only heard of one person who had accomplished this,
> and he was using the resources of a government funded research group. He had
> a large field of fixed yagis, and when the moon came across the boresite of
> the array, he did EME for grins.
>   Consequently, 6 meter EME intereferance is really a non-issue. Let alone the
> channel 2 problem.
>

  Actually, a number of amateurs were successful. Among the first, if
not the first, was Lou Ancieaux, wb6nmt, later of Lunar Electronics
fame. He used a rhombic located at the Naval Receiver Facility near
Sonoma, California but it was "homebrew" and I don't believe there was
any real funding by the government except for space to put it and maybe
a little help getting poles placed to support it.

  I remember hearing not only echos but terrestrial backscatter from
w0eye (I think) in Colorado as he and wb6nmt tried with one or two other
stations to make EME QSO. This must have been ~1970. w7fn was also
active and I'm pretty sure there were several others. 50 MHz amateur
EME has been achieved by several amateurs. I'd say it's not been a
major use of the band though.

>   2 meter and 70 cm interferance could be a problem. These are the two most
> used EME bands. 70 cm is a very good band for eme.
>
>   900 Mhz is a non-issue too. The ham SS would just be a small addition to
> the existing commercial licensed, and unlicensed activity. Of which the li-
> censed activity has priority over ham radio in this band.
>
>   2.4 Ghz is an issue. This is the best space communications band available
> to Hams. But, due to terrain absorbtion, and antenna directivity, it should
> be workable. The moon is rarely on the horizon. And an upward pointed EME
> array will really do a wamy on any 1 watt DSSS signals. FHSS can be programmed
> to avoid the EME spectrum altogether.

  From my experience, 70 cm and 23 cm are excellent bands for EME,
particularly the latter. 2.4 has been relatively unused for the mode,

largely I think due to the difficulty and expense of generating a lot of narrowband transmit power. w6yfk was on for many years with a "near commercial" installation and wa6exv was working at a locked microwave_oven/rain_gutter_for_waveguide arrangement and there have been a few stalwarts operating in the EME contests but by and large the band has gone unused in comparison with other amateur bands for EME.

> I guess the best advice for EME's is to do it "right". That is, design an-
> tennas primarily for off boresite rejection of signals. SS is not the only
> terrestrial noise source, anyway. Blowing up about SS, is stupid, when there
> is so much other noise out there. Especially from power poles, cars and con-
> sumer computing/entertainment devices, and compact florescent lighting, and
> power factor controllers, and and and...

and as you say, for all of the higher bands where the system temperature stands a chance of being lower than 290 K, just pointing a significant part of the beam at terra firma is a bad idea both due to signal loss and thermal noise increase. It is pretty standard practice to measure noise temperature (noise figure) of an EME station by comparing the noise floors when pointed at cold sky (a known radio-quiet region of the heavens) and local dirt. From the measured delta it is easy to compute Tsys and it gives one a pretty good overall station performance number something which is very desirable when you can't hear echos and don't know why.

"Doing it right" is a win for both SS and EME, probably more so for EME due to the extremely low link margins that even the best amateur moonbounce stations run.

It seems to me that in general, there is a lot more discussion of potential interference issues that people can *imagine* might be problems WRT amateur SS and narrowband uses than there is experience with the reality of the situation.

I haven't yet put any of my DSSS stuff for L3TNC on the air at more than the bench level; no testing over real paths that is, but our existing FSK 904 MHz digital radios *have* been coexisting with a variety of radios and services in 902-928 for ~5 years now. At 230 kbps their occupied bandwidth is a little more than half a megahertz. They are wide enough and some of our link margins low enough that we are potential "targets" for problems from Part 15 and military uses of the same spectrum. In addition, these radios don't operate well at very low C/N ratios.

In spite of locating this hardware in and near the edge of a city of 1/8 million during these last years and in spite of the presence of a large variety of signals from SS sources; consumer, commercial etc, we have had very few problems with sharing the spectrum with SS or any other users in this busy band. I say this in part to refute other statements to the contrary attributed to me on other distribution lists.

This success we have seen is due to antenna directivity along with the restricted power of Part 15 users but most of all due to the tremendous incremental path losses associated with the non-LOS paths that exist to almost all potential interferers. The incremental losses accrued for almost all paths between low-level sites far exceed the processing gains and even the antenna directivity losses that might also be available to reduce the interference problem. For the most part we could all be running non-spread on the same channel(a variety of widths actually) and things would work as well.

There have been two exceptions to this; Part 15 devices which are *very* close, colocated or within a few tens or a hundred feet of our radios and Navy ship-to-air radar with its 270 megawatt ERP. To the best of my knowledge, our transmissions have not interfered with *any* other users.

So, while I understand the concern at the thought of potential loss of use by EME operators (I used to be one and have a stack of QSLs to prove it for both 432 MHz and 1296 MHz) I think the severity of the "problem" is generally overestimated. If all users were located on hilltops and LOS to each other, the situation could be somewhat different. (As we put OCARs on the band we have to be careful about "fixing" the paths among users too well).

As has already been stated, no amount of processing gain will ever be enough to allow mindless addition of SS users to a band. Some scenario can always be envisioned in which there would be problems. However, the realities of signal propagation at UHF and microwave over paths between

typical amateur sites are such that, I believe, any problems can be
solved by amateurs willing to cooperate. Whether we still have such
willingness to get along is another question entirely.

Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|
| |
| http://www.tapr.org/~n6gn/index.html |

14. [SS:595] Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Mon, 2 Dec 96 20:12:24 +0000
To: ss@tapr.org
Message-ID: <H000029202e761e2@MHS>
Rendered body type: text/plain

Glenn wrote:

> It seems to me that in general, there is a lot more discussion of
> potential interference issues that people can *imagine* might be
> problems WRT amateur SS and narrowband uses than there is experience
> with the reality of the situation.

I agree. A lot of the potential problems can be ovoided by good design,
using appropriate frequencies, powers, antennas etc, ovoiding for
example the narrow 1296 segment of 23cm, and of course by mutual
cooperation in the few cases of interference that may still happen.

Most of the defensive reaction to SS seem to be based on the
appearence of some SS activists to have total disregard for other
users, blindly claiming that there can't possibly be a problem, and take
no precautions against interference in their system designs. To gain
support for SS it must be made clear that the SS comunity takes
interference seriously, makes every effort to reduce it to a level where
other users will not be effected, and will listen to concerns about
possible interference. Too much pro-SS rhetoric is based on
extrapolation of examples of well designed systems operating under quite
different circumstances, claiming that if the other systems don't have
problems neither will we, without even considering the problems while
the systems they quote are usually carefully designed to ovoid such
problems.

> This success we have seen is due to antenna directivity along with the
> restricted power of Part 15 users but most of all due to the
> tremendous incremental path losses associated with the non-LOS paths
> that exist to almost all potential interferers. The incremental
> losses accrued for almost all paths between low-level sites far exceed
> the processing gains and even the antenna directivity losses that
> might also be available to reduce the interference problem. For the
> most part we could all be running non-spread on the same channel(a
> variety of widths actually) and things would work as well.

Sounds like one of many strong argument for microwave SS rather than VHF
SS.

> So, while I understand the concern at the thought of potential loss
> of use by EME operators (I used to be one and have a stack of QSLs to
> prove it for both 432 MHz and 1296 MHz) I think the severity of the
> "problem" is generally overestimated. If all users were located on
> hilltops and LOS to each other, the situation could be somewhat
> different. (As we put OCARs on the band we have to be careful about
> "fixing" the paths among users too well).

> As has already been stated, no amount of processing gain will ever be
> enough to allow mindless addition of SS users to a band. Some
> scenario can always be envisioned in which there would be problems.

> However, the realities of signal propagation at UHF and microwave over
> paths between typical amateur sites are such that, I believe, any
> problems can be solved by amateurs willing to cooperate. Whether we

> still have such willingness to get along is another question entirely.

I agree here too. I think microwave SS is a real winner, and is the
future of amateur radio. We don't want to tarnish the SS comunity by
mindlessly applying SS where it does not belong, or even where it
doesn't work best. Our efforts should be focused on the future, creating
a viable amateur SS WAN and high speed links, away from established
technologies, in a new frontier where the is room to grow! Lets show the
rest of the amateur community that we are prepeared to cooperate, and
respect their use of the bands.

Rob

15. Re: [SS:590] SS below 70cm?

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Mon, 2 Dec 1996 14:47:37 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612022247.OAA21279@wireless.net>
Rendered body type: text/plain

In [SS:590] Re: SS below 70cm?" Robert.Glassey@nmp.nokia.com writes:

>It does baffle me a bit that people would actually want to promote SS on
>bands below 70cm, or even 70cm itself. There are many technical problems
>relating to interference resistance and band sharing. These bands are
>already heavilly used (depending upon your definition of use,
>educational, simplicity, installed equipment, etc, not just user bits
>per Hz), there is no readilly avaliable equipment, there is very little
>bandwidth, and there is the obvious political agro from those who
>already use the band, and exploit the low noise floor for DX and EME, or
>the simplicity of FM for cheap, power efficent hand helds, or what ever.

Rob--

When was the last time you looked at your spectrum analyzer of 6m, 2m,
220, 450? What were the counts of simultaneous signals per MHz,
minimum, average, maximum, on a per-second basis? What numbers do you
get if you look at the frequencies used for "Trunked" services, one of
the simplist versions of slow Frequency Hopping SS? The utilization
density for SS is significantly higher. You don't have any interference
until you get denial-of-service, when you run out of channels. It's
worth noting that it takes complexity to get higher utilization at
equivalent levels of performance. SS systems are inherently complex,
and that is one of the reasons why SS has not been much pursued in
Amateur contexts. The idea of "find an unused frequency(s) and use it
(them)" is exactly what FHSS accomplishes, as I demonstrated some time
ago in one of my STA experiments, much to the shock/chagrin of the local
frequency-coordinators. HOWEVER, doing this required significantly
greater system complexity than is the current state-of-the-art used
by the current band occupants. Therein lies the rub. Other services
are now eyeing our allocations, seeing their sparce use, and are
perfectly willing to apply whatever capital investment is required
to use them efficiently/completely. We amateurs are not without the
same resources and ingenuity; what we lack, currently, is motivation.
We somehow think that the current "the bands are heavily used"
argument will continue to hold up. Soon, it won't. What then?

SS has the potential to give us the vehicle to save our bands
from commercial piracy, and that, to me, is a very compelling
reason for encouraging its use at VHF. Perhaps more immediately,
it gives us the means to break the logjam of "no more frequencies
available" and do it automatically as part of the frequency hopping
pattern development. Add to that it's potential for advances in
weak-signal work, it doesn't take much to convince the objective
observer. SS is an idea, not a particular realization. Like
Ham Radio generally, different uses result in varied realizations.
So long as good engineering practice and design criteria contemplate
the minimization of interference, satisfactory results can be
had by all. Isn't that the spirit of cooperation we're talking about?

best regards/bob K6KGS

16. Re: [SS:597] Re: SS below 70cm?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Mon, 2 Dec 1996 17:46:34 -0600 (CST)
To: ss@tapr.org
Cc: ss@tapr.org

Message-ID: <Pine.BSF.3.91.961202173635.22770A-100000@tekdata.com>
Rendered body type: text/plain

On Mon, 2 Dec 1996, Robert A. Buaas wrote:

> In [SS:590] Re: SS below 70cm?" Robert.Glassey@nmp.nokia.com writes:
>
> >It does baffle me a bit that people would actually want to promote SS on
> >bands below 70cm, or even 70cm itself. There are many technical problems

>
> When was the last time you looked at your spectrum analyzer of 6m, 2m,
> 220, 450? What were the counts of simultaneous signals per MHz,
> minimum, average, maximum, on a per-second basis? What numbers do you
> get if you look at the frequencies used for "Trunked" services, one of
> the simplist versions of slow Frequency Hopping SS? The utilization
> density for SS is significantly higher. You don't have any interference

Lets also get down to the truth. I live in the Chicago area and recently
bought a "Ten-Tec" 2m to 6m transverter kit. I wanted to align the
receiver with an on-air signal before finishing the kit. Do you know
why I couldn't? There were no on-air signals on 6m! For like a week!
I finished the unit, and keyed up the one active repeater on 6m and used
the "Kerchunks" to align the receiver. Then I tried to make a contact
through the repeater when I was done with the unit, and couldn't get
anyone back to me. Yes, Chicago has a channel 2, but trust me
70cm and above isn't much better.

Even on 2m in Chicago, except for "prime-time" there is only maybe
2-3 QSOs going on at once over the whole band.

We have to face the fact that SS is going to infringe on a group of
hams that believe that have rights to spectrum that they, frankly, don't
use.

People tend to fear what they don't understand!

Ham radio is almost cooked anyway. You are right that SS and digital
modes are going to be the last hope of the hobby.

Fred M. Spinner, KA9VAW
fred@tekdata.com, ka9vaw@amsat.org

17. Re: [SS:585] Re: SS on 2m

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Tue, 3 Dec 1996 01:55:56 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199612030155.BAA00631@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Dave Koberstein said:
> Interestingly, DSSS actually reduces your S/N slightly in the case where
> that interfering signal would not have been on top of your narrow band
> signal, had you not used DSSS. Using DSSS, the interferer is "spread" in
> the receiver by the despreading function and you actually get energy in
> your IF that you wouldn't have had otherwise.

Good point. If you have any strong local 2m activity (and who
doesn't?), then your noise floor will be significantly worse with DSSS
than with narrowband signalling.

> However, if your interfering signal is just thermal noise, atmospheric
> noise, or even another DSSS signal that is spread completely across your
> band of interest, the despreading will just "respread" that interfering
> signal across the same bandwidth. This gives you no advantage compared to
> sending your signal unspread in the first place.

The potential advantage of SS in EME is mitigation of libration fading.
If you don't have much local 2m activity, it would probably be
worthwhile to try it.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

18. Re: [SS:590] Re: SS below 70cm?

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Mon, 02 Dec 1996 21:11:04 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19961203021104.006cab14@gnatnet.net>
Rendered body type: text/plain

At 06:33 AM 12/2/96 -0600, you wrote:
[snip]

>It does baffle me a bit that people would actually want to promote SS on
>bands below 70cm, or even 70cm itself. There are many technical problems

[snip]

Hmmmm...

I have always been interested in the HF propagation experiments the Navy did in the Artic. I would really like to be able to do SS in the HF bands to measure propagation delays between stations and different parts of the world. We could have SS beacon stations transmitting and we would know more about the atmospheric effects than by just simply saying "I hear it."

[snip]

>The SS comunity claims to be (and should be) pushing the frontiers of
>technology, so why on earth restrict yourself to ancient VHF RF
>technology and then take the heat for not being compatible with the old
>technology you are using!

[snip]

Since when did pushing technology become a function of frequency?

- Steve, N7HPR
(n7hpr@tapr.org)

19. [SS:599] Re: SS on 2m

From: Robert.Glassey@nmp.nokia.com
Date: Tue, 3 Dec 96 11:50:59 +0000
To: ss@tapr.org
Message-ID: <H000029202e81b16@MHS>
Rendered body type: text/plain

Barry McLarnon VE3JF/VA3TCP wrote:

> Good point. If you have any strong local 2m activity (and who
> doesn't?), then your noise floor will be significantly worse with DSSS
> than with narrowband signalling.

Exactly! This has the collary that you must therefore transmit higher SS power, which will have a much greater interference potential to the other users of the band.

Directional antennas will help, but are much better at higher frequencies, where other activity is less and use much lower power with higher path losses, and usually in a small section of the band leaving 10's of MHz free for SS use, and expand into.

Notching/hopping schemes will also help but this gets pretty complicated unless you restrict you bandwidth to ovoid repeater/simplex FM frequencies, plus EME/DX/SAT frequencies (what's left?). You don't need to worry about this at 23cm and above.

Rob

20. [SS:597] Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Tue, 3 Dec 96 13:28:11 +0000
To: ss@tapr.org
Message-ID: <H000029202e81b02@MHS>
Rendered body type: text/plain

>> relating to interference resistance and band sharing. These bands are
>> already heavilly used (depending upon your definition of use,
>> educational, simplicity, installed equipment, etc, not just user bits
>> per Hz), there is no readilly avaliable equipment, there is very

> Rob--
>

> When was the last time you looked at your spectrum analyzer of 6m, 2m,
> 220, 450? What were the counts of simultaneous signals per MHz,
> minimum, average, maximum, on a per-second basis? What numbers do you
> get if you look at the frequencies used for "Trunked" services, one of
> the simplist versions of slow Frequency Hopping SS? The utilization
> density for SS is significantly higher. You don't have any

I know what you are saying, but like I said it depends upon you
definition of use. On HF for example if you dont have a beam, and listen
on a frequency, hear nothing and them transmit, you may well get a reply
telling you the frequency is in use.

Of course if SS was the only mode in use you could fit a lot more
stations on the same band, but is that the only valid use for the band?

SS gets more users on a band though reusing frequencies. You cannot
allow anyone to transitt higher power (since 1 station with 100 times
the power (say 10W instead of 100mW) is the same as 100 low power
stations in a DSSS system). Also if the SS system is actually makeing
use of the its capacity then the noise floor MUST be raised by an amount
equivilent to the processing gain, that also excludes DX. So if DX is to
be considered a valid use of amateur radio for any of the numeous
reasons, then we must accept the it will USE a lot more capacity than SS
even though it may actually only be on for a small amount of the time,
and may never show up on a spec-an. This is a different use to
commercial trunked systems, and it uses more resources, but should be
exclude it because of that?

But its not just DX, FM takes a lot of bandwidth, when a trunked digital
system would be much more spectraly efficent. But we are amateurs, one
reason for using simple FM is that beginners can easilly build a FM
transceiver from a few chips and transistors, where we could never build
a full trucked digital transceiver. We sacrifice spectrum utility for
simplicity of equipment, because we are amateurs, and simplicity is an
essential ingrediant in home brew and self training. This is a valid use
of amateur resources, using them for the purpose they were allocated. My
first receiver was a crystal set! and my first home brew HF transceiver
was DSB, because it was simple. I didn't start by trying to build a
multiband, multimode, digitally controlled, synthersised rig, and even
now only make things that complex at work, and use the Giga word.

We should not get carried away trying to get the most users per Hz, that
is a commercial approach, and provides very little for the radio
experimenter and beginners. Many valid uses of amateur radio will be
spectrally inefficent, and wont show up on a spec-an, but that makes
them no less important. To argue against these modes is to argue against
the whole concept of amateur radio!

SS networks is one area where spectral efficency is both possible and
desireable, so lets go for it! But you wont get it if you have to share
with uncontrolled narrow band technology on VHF.

> The idea of "find an unused frequency(s) and use it
> (them)" is exactly what FHSS accomplishes, as I demonstrated some time
> ago in one of my STA experiments

This assumes of course you can hear the EME/DX that another operator has
build a massive antenna system to receive.

> HOWEVER, doing this required significantly
> greater system complexity than is the current state-of-the-art used
> by the current band occupants.

Exactly, if you keep away from these guys all together you dont need
such complexity, and can focus your efforts on getting performance out
of your system.

> Therein lies the rub. Other services
> are now eyeing our allocations, seeing their sparce use, and are
> perfectly willing to apply whatever capital investment is required
> to use them efficiently/completely. We amateurs are not without the
> same resources and ingenuity; what we lack, currently, is motivation.
> We somehow think that the current "the bands are heavily used"
> argument will continue to hold up. Soon, it won't. What then?

Like I say it depends upon your definition of use, when I tune over the
HF band I am often impressed at how well utilised the amateur bands are
compared to the commercial bands. The amateur bands are often as packed

as the short wave broadcast bands, and use a more efficent modulation system as well!

When I tune over the land mobile and aeronaughtical bands on VHF-UHF I find a similar situation, the ham bands are often better utilised than the commercial bands, expect for a few spot frequencies, and the cellular bands around 900MHz. How about UHF TV, there's a few hundred wasted MHz (counting only the empty channels :-), or is it? The military also have 100's of MHz here that also appears empty - except when an exersize is going on, but is it?

The amateur allocations that are under real threat are the microwave bands. The only reason commercial interests target amateur bands is that they see us as easy pickings (perhaps because of our infighting), not as free bandwidth.

> SS has the potential to give us the vehicle to save our bands
> from commercial piracy, and that, to me, is a very compelling
> reason for encouraging its use at VHF. Perhaps more immediately,
> it gives us the means to break the logjam of "no more frequencies
> available" and do it automatically as part of the frequency hopping
> pattern development. Add to that it's potential for advances in
> weak-signal work, it doesn't take much to convince the objective
> observer.

You cant argue that there are no more frequencies, while at the same time say there is no activity! FM isn't that inefficent!

Channel searching can be added to amateur FM systems, but doesn't need to be, since the operators already do it 'QSY'. If you want more activity you need more users, not channel changeing. By discouraging existing users (with political agro) and using 'below the noise' SS systems you are warmly inviting commercial piracy. And if SS activity is enough to justify a amateur allocation, the noise floor, (or chance of repeatedly hopping onto a frequency that someone you cant hear is using with more sensitive equipment) must become significant.

You can't claim SS is efficent if it doesn't interfere, and I don't believe SS efficency is worth causeing the other users interference.

There is of course a small amount of (inefficent) experimental activity that can be tollerated, but this can never become a viable SS WAN with competitive data rates and user/HZ efficency, not without stepping on a lot of toes, and even then the system wouldn't come close to a microwave system for performance and simplicity, which you would loose by not using microwave bands.

I see no reason to cause any agrovation, justified or otherwise, by using SS on VHF, when microwave is so much easier, and has much greater potential to expand. SS needs support to be successfull, you dont get that by standing on everyone's toes.

Rob

21. W5YI Report on TAPR SS STA

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Tue, 3 Dec 1996 08:29:13 -0800
To: ss@tapr.org, fccreg@tapr.org, netsig@tapr.org
Message-ID: <v03010939aeca04eb73ee@[204.118.182.22]>
Rendered body type: text/plain

The latest edition of the "W5YI Report", Vol. 18, Issue 23 has a special report on the TAPR SS STA and Lyle Johnson's keynote talk at this year's ARRL/TAPR DCC.
        Check it out!! More info on the "W5YI Report " can be found at: <http://www.w5yi.org/>.

-- Dewayne

--
~~~~~~
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering   ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar   ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204   ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854   !
~~~~~~

22. unsubscribe

From: "rwtaylor" <rwtaylor@m5.sprynet.com>
Date: Wed, 4 Dec 1996 00:12:32 +0000
To: ss@tapr.org
Message-ID: <199612031748.JAA18828@m5.sprynet.com>
Rendered body type: text/plain

could you temporarily unsubscribe me from this list

thanks
Robert Taylor
KL7ENY/HS0CZG
RT

23. Re: [SS:602] Re: SS below 70cm?

From: Steve Stroh <strohs@halcyon.com>
Date: Wed, 4 Dec 1996 08:49:24 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.ULT.3.95.961204083119.19059D-100000@coho.halcyon.com>
Rendered body type: text/plain

On Tue, 3 Dec 1996 Robert.Glassey@nmp.nokia.com wrote:

> But its not just DX, FM takes a lot of bandwidth, when a trunked digital
> system would be much more spectraly efficent. But we are amateurs, one
> reason for using simple FM is that beginners can easilly build a FM
> transceiver from a few chips and transistors, where we could never build
> a full trucked digital transceiver.

I'd classify that as an assumption on your part rather than a "truth".
>From what little I know of trunked systems, it would be relatively easy to build a functional trunked radio. All that is required is to listen to a dedicated control channel (simple receiver for 220 perhaps) in addtion to the primary receiver, and transmit a small amount of data to the trunking controller to reserve a channel. A small unit simpler than a TNC could handle this, and a slightly more complex unit on each repeater.

> We sacrifice spectrum utility for
> simplicity of equipment, because we are amateurs, and simplicity is an
> essential ingrediant in home brew and self training.

My perception is that we sacrifice spectrum utility because each group wants "their own" ego box repeater on the air, and if you're not a member of that group, you're discuraged in subtle or overt ways from using that repeater. Being excluded, YOU want to build your OWN ego box repeater so you can talk too. In the early days of repeaters, there were enough frequencies available that this wasn't a problem. In the 1990's, in most metro areas all the frequencies are spoken for (note I didn't say In Use). There's now incentive to share repeater systems between user groups, but no real interest because the pattern has been set over the last 25 years that each group has a separate repeater on its own frequency.

All it would take is one talented group in one metro area and a small number of repeaters.

Steve N8GNJ

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

24. [SS:605] Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Wed, 4 Dec 96 19:29:18 +0000
To: ss@tapr.org
Message-ID: <H000029202eb267e@MHS>
Rendered body type: text/plain

>> system would be much more spectraly efficent. But we are amateurs,
>> one reason for using simple FM is that beginners can easilly build a
>> FM transceiver from a few chips and transistors, where we could never
>> build a full trucked digital transceiver.
>
> I'd classify that as an assumption on your part rather than a "truth".

> From what little I know of trunked systems, it would be relatively
> easy to build a functional trunked radio. All that is required is to

OK yes, it wouldn't be too dificult for me or perhaps you to make such a system, after all I do it for a living, but I haven't got the time or

inclination to do it in my spare time. I perfer to do smaller scale projects that focus on perhaps one single technical aspect, which I have the time and interest to do. Similary a beginner might actually attempt a simple FM transceiver, where they wouldn't dream of trying it if they had to make a full systhisised trunked radio with microprocessor control and digital modulation and demodulation, just to get on air. They'ed just buy one. That would mean the death of home construction, and any experiance amateurs might gain in doing it. Then who would be left to build a SS unit?

Ham radio should not be an exclusive club where only experianced engineers can get a licence, it's about learning, and a beginner gets the most immediate results if he can attach a crystal to a frequency multiplier chip, add a variactor across the crystal, and built a small PA with say 1/2 a watt output, and get on air! Or convert a land mobile rig in his spare time because even if he was an experiance engineer he doesn't want to build a transceiver from scratch, but wants something to play around with, try new techniques etc. The posibilities are limitless, and that's the way it should be. We should not make something as complex as a truncked radio minimum entry level, as the home brewers simplist choice. That would spell the end of home brew, since its easier to just buy the equipment, and you wouldn't be able to use anything you could reasonably build in your spare time, unless it was a major project.

This is not to say that there shouldn't be high tech stuff, after all those with more experiance will want to do more complicated things. What I'm saying is that the simpler stuff is just as valid use of amateur radio as is the complex stuff, and should not be excluded by a few people with greater expriance, who perhaps see the whole band as their personal property and resent the existance of lower tech users. That's getting too eliteist for me.

Lo tech, inefficent modes, or weak signal work can be just as valid a use of the ham bands, in accordance with the purpose amateur bands are allocated. They are not second class users.

Yes, we cant get too carried away supporting outdate modes, but at the same time we dont want to set the entry level too high. As technology progresses, the newer modes will become as easy as the older modes so you might as well go for the new modes. I never built a CW transceiver, since a DSB transceiver way not much more complex and much more usefull. (since I'm not a big CW user). Then I didn't do SSB because I could get away with DSB.

Efficency is a good argument for getting the maximum speed and number of users out of a SS network, but can never be used as an argument the claim moral superiority over other valid uses of the amateur spectrum. You respect them and they'll respect you, they might even join you!

> My perception is that we sacrifice spectrum utility because each group
> wants "their own" ego box repeater on the air, and if you're not a
> member of that group, you're discuraged in subtle or overt ways from
> using that repeater.

This is unfortunate, I gather it happened here in England too, but thankfully most have grown out of that sort of behaviour. In New Zealand, my original QTH, repeater contruction was often coordinated on a national level, and roaming activity was encouraged, and several repeaters were built specifically for the purpose of repeater DX! One I was involved in could often make contacts over 1000km on 2m, and used two seperate phased array antennas for diversity with microprocessor control. Today a national system of 70cm repeaters links the entire country, with some sections of the link now going digital (and trunked) over a 700kbps link. The beginner can still access it with his 'crystal set' though. I once cobbled together a 70cm transciever out of spare test equipment and modules and made a contact over 1000km using the link. Thats no major task, but its fun to do!

73's,

Rob

25. Re: [SS:606] Re: SS below 70cm?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Wed, 4 Dec 1996 14:38:00 -0600 (CST)

To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.961204141824.26364A-100000@tekdata.com>
Rendered body type: text/plain

On Wed, 4 Dec 1996 Robert.Glassey@nmp.nokia.com wrote:

>
> OK yes, it wouldn't be too dificult for me or perhaps you to make such a
> system, after all I do it for a living, but I haven't got the time or
> inclination to do it in my spare time. I perfer to do smaller scale
> projects that focus on perhaps one single technical aspect, which I have
> the time and interest to do.

>
> Ham radio should not be an exclusive club where only experianced
> engineers can get a licence, it's about learning, and a beginner gets
> the most immediate results if he can attach a crystal to a frequency
> multiplier chip, add a variactor across the crystal, and built a small
> PA with say 1/2 a watt output, and get on air!

> This is not to say that there shouldn't be high tech stuff, after all
> those with more experiance will want to do more complicated things. What
> I'm saying is that the simpler stuff is just as valid use of amateur
> radio as is the complex stuff, and should not be excluded by a few
> people with greater expriance, who perhaps see the whole band as their
> personal property and resent the existance of lower tech users. That's
> getting too eliteist for me.
>
> Lo tech, inefficent modes, or weak signal work can be just as valid a
> use of the ham bands, in accordance with the purpose amateur bands are
> allocated. They are not second class users.

(No, actually under all proposals now, the SS users are second-class
under the "lo-tech")

I am kinda getting a kick out of this line of thought because I don't
think any engineer would ever mind someone using a simple mode like
FM to learn. We done it ourselves in the past! I don't know how this got
"read-in" to the debate.

Actually, the engineers in the hobby tend not to be of the "frequency
coordinator" type who like to restrict what we can do IMHO.

IMHO, the hams under FCC rule are Americans. We are supposed to be a
capitalistic and free society. When it comes right down to it, ham radio
is a method of allowing self-education. The reason we have ham
bands is that an individual in this country should have some access to
spectrum. The "public-safety" and "trained operator" excuses are fine
too, but I think really we've survived because we should have from
a ethical standpoint. Freedom of speech is another little reason for
having ham radio too..

(A company would have lost our bands due to underuse years ago!)

Having said that, I think we should TRY co-existing SS and narrowband
modes, and see if we have a problem before we assume we do!
-- The more activity, learning, etc. the better!

It's amazing to me how afraid hams have become to new ideas and progress.
For once I think the ARRL has gone in the right direction.
I'm disappointed in AMSAT. If our technically knowledgable hams fight
others like that we are sunk- we should know that we can work together
and capitalize upon innovation.

Or we can stagnate into non-existance.

P.S. AMSAT going against PANSAT really made AMSAT look foolish, IMHO.

Fred M. Spinner, KA9VAW
fred@tekdata.com, ka9vaw@amsat.org

26. Re: [SS:607] Re: SS below 70cm?

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Wed, 4 Dec 1996 17:33:25 -0500
To: ss@tapr.org
Message-ID: <199612042233.RAA29726@Paris.GASD102designcenter>
Rendered body type: text/plain

Fred M. Spinner, KA9VAW wrote:
> Having said that, I think we should TRY co-existing SS and narrowband
> modes, and see if we have a problem before we assume we do!
> -- The more activity, learning, etc. the better!

I said the same thing 6 months ago! Some of us KNOW SS has some strong
points and several have demonstrated it. Why are we back to argueing about it?
SS will never progress at this rate; that is why I am proceeding with SS WITHOUT
getting into a discussion about!!!

> It's amazing to me how afraid hams have become to new ideas and progress.

Sickening is the word that comes to my mind ...

> P.S. AMSAT going against PANSAT really made AMSAT look foolish, IMHO.

I didn't hear about this. What reason did AMSAT give for not supporting PANSAT?

73s de Tony, KE4ATO

27. Re: [SS:608] Re: SS below 70cm?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Wed, 4 Dec 1996 17:59:58 -0600
To: ss@tapr.org
Message-ID: <v03007801aecbc0b83c62@[129.120.111.42]>
Rendered body type: text/plain

>I didn't hear about this. What reason did AMSAT give for not supporting
>PANSAT?
>
>73s de Tony, KE4ATO

A good question for AMSAT-BB sometime. It wasn't really an issue of not
supporting PANSAT, but some other issues.

You should read the reply comments that AMSAT files on RM-8737 if you
havn't. All the comments and reply comments we could get on-line are on
http://www.tapr.org/ss

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

28. Interest in a Senior Project

From: clh10@po.cwru.edu (clh10@po.cwru.edu)
Date: Wed, 4 Dec 1996 20:06:02 -0500 (EST)
To: ss@tapr.org
Message-ID: <v01550100aecb85f8a10d@[129.22.249.174]>
Rendered body type: text/plain

Greetings,

I am an electrical engineering major at Case Western Reserve
University in Cleveland OH, finishing my senior year. As part of our
graduation requirement, we must complete two senior projects. The first one
I have finished, and was based on the simulation of the forward-link code
division multiple access transmission signals according to IS-95. While it
was an excellent way to learn about the theory behind CDMA, and Spread
Spectrum as a whole, the simulation was done solely in programming. Next
semester, when I continue my second senior project on the area of Spread
Spectrum communications, I would like to work on a problem that involves
hardware rather than computer simulation. However, since my department is
not particularly strong in the area of communications, I am looking outside
of the university for ideas on what particular task in SSC would be
suitable. If you have any tasks that you would feel are suitable for this
purpose, I'd like to hear about them. In addition, there is at least one
other student who is interested in pursuing a senior project in this area
as well.

Thank you,
Cory L. Hojka
N9RBA (technician w/ code)

Cory L. Hojka   <clh10@po.cwru.edu>
Beta Nu of Theta Chi Fraternity
Case Western Reserve University
Cleveland, OH

Two dogs crow in the bark.
Their hunger, their tummies rub.
Cries the cat of the soul, Yip Yip.
Such are the things way are.

29. Re: [SS:608] Re: SS below 70cm?

From: Edward Sadowski <edsadow@ids.net>
Date: Wed, 4 Dec 1996 21:45:26 -0500 (EST)
To: ss@tapr.org
Message-ID: <1.5.4.16.19961204214640.1c27266c@mail.ids.net>
Rendered body type: text/plain

At 04:33 PM 12/4/96 -0600, you wrote:
>Fred M. Spinner, KA9VAW wrote:
>> Having said that, I think we should TRY co-existing SS and narrowband
>> modes, and see if we have a problem before we assume we do!
>> -- The more activity, learning, etc. the better!
>
>I said the same thing 6 months ago! Some of us KNOW SS has some strong
>points and several have demonstrated it. Why are we back to argueing about it?
>SS will never progress at this rate; that is why I am proceeding with SS
WITHOUT
>getting into a discussion about!!!
>
>> It's amazing to me how afraid hams have become to new ideas and progress.
>
>Sickening is the word that comes to my mind ...
>

You guys are on the cutting edge! Don't forget, there are lots of hams out
there who DON'T own a computer or do ax.25 or any of the simple stuff we
take for granted and old hat! Those guys are AFRAID of THESE things!!!
Just remember, explorers and trail blazers always have been, are, and always
will be in the avant garde minority. The rest are content in being sheep.
Although I don't have the knowledge or expertise of you fellows, I can
appreciate and applaude your pioneering work.

73, Ed, W1BF

>> P.S. AMSAT going against PANSAT really made AMSAT look foolish, IMHO.
>
>I didn't hear about this. What reason did AMSAT give for not supporting PANSAT?
>
>73s de Tony, KE4ATO
>
>

30. Re: [SS:608] Re: SS below 70cm?

From: George Cserenyi <zsolt@direct.ca>
Date: Wed, 4 Dec 1996 20:45:11 -0800 (PST)
To: Tony Lanier <rlanier@su102s.ess.harris.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.91.961204204223.3353B-100000@boxer.direct.ca>
Rendered body type: text/plain

Yes, yes, yes!

On Wed, 4 Dec 1996, Tony Lanier wrote:

> Fred M. Spinner, KA9VAW wrote:
> > Having said that, I think we should TRY co-existing SS and narrowband
> > modes, and see if we have a problem before we assume we do!
> > -- The more activity, learning, etc. the better!
>
> I said the same thing 6 months ago! Some of us KNOW SS has some strong
> points and several have demonstrated it. Why are we back to argueing about it?
> SS will never progress at this rate; that is why I am proceeding with SS WITHOUT
> getting into a discussion about!!!
>
I'd like to do the same, am long on time but short on cash az being a
retired hard/soft-ware engineer. Where sould I start? Ho much will it cost
to get a test setup going?
George
ve7ciz

> > It's amazing to me how afraid hams have become to new ideas and progress.
>
> Sickening is the word that comes to my mind ...
>
> > P.S. AMSAT going against PANSAT really made AMSAT look foolish, IMHO.
>
> I didn't hear about this. What reason did AMSAT give for not supporting PANSAT?
>
> 73s de Tony, KE4ATO
>
>
>

31. Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Thu, 5 Dec 96 12:09:05 +0000
To: ss@tapr.org
Message-ID: <H000029202ed1950@MHS>
Rendered body type: text/plain

> I am kinda getting a kick out of this line of thought because I don't
> think any engineer would ever mind someone using a simple mode like
> FM to learn. We done it ourselves in the past! I don't know how this

> got "read-in" to the debate.

Sorry, I'm flying off on a tangent here. The point was that spectral efficency isn't the only parameter to consider when allocating spectrum, especially for amateur radio.

That fact that 2m is often under used compared to a trunked system or a SS system is almost irrelivent, since that is not what it is allocated for, although it my be an argument to reduce the size of the band.

Getting more users on the band would help reduce this posibility, but there are other bands, that are of considerably more value to us if we want to create a decent SS WAN, which has even lower utility (like practically nill) and is (or soon will be) under direct pressure from commercial interests who want to use it for the same purpose. Commercial interests could take the microwaves bands almost without resistance, when there is a large base of users on 2m.

Putting SS on 2m is not a very good way of saving the band, if it needs saving at all. There is already a lot of people who will fight for 2m. You only create in-fighting and discourage utilisation of the band by non-SS users. This only works against us! If you want to fill a band, go for the ones that are of most value to SS.

I'm sure SS will work on a small experimental scale on 2m if enough attention is paid to ovoiding narrow band signals (mostly because of their effect of SS performance), but 2m can never support a decent WAN, and the agro and technical dificulities of operating SS on a band occupied by high power low tech users seem to make the whole exersize pointless.

Please, don't underestimate the objections many have to SS, we are not all afraid and ignorant, and we do not unilaterally oppose SS either. I greatly SUPPORT the principle of SS and its application to amateur data netorks which desprately needs to be brough into the 21st century. I have been involved in the design and construction of 'amateur' (ISM) and commercial SS transcievers for several years now (all above 800MHz), and have a great interest in SS theory particularly as it applies to high performance digital networks, and have studied it at post graduate level in conjunction with phD projects and 900MHz multipath propagation studies.

I'm interested in creating a high performance amateur SS WAN, and see no need to go anywhere near frequencies justifiably used by other amateurs to do it. I see no need to even take the risk of causing interference, and believe any well utilised SS system MUST operate above the noise floor if it is to be efficent, which is what we want. I see no need for either narrow band users OR SS users to compromise on this issue. There is room enough for everyone, provided we dont let the microwave bands be lost to comercial interests.

We have been given almost ideal frequencies for SS networks yet some people want to throw them away and fight other amateurs for spectrum

that is much less than ideal anyway!

This is what baffels me!

Rob

Not frightened of either SS or the Giga word!

32. Re: [SS:610] Interest in a Senior Project

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Thu, 5 Dec 1996 10:40:16 -0500 (EST)
To: clh10@po.cwru.edu
Cc: ss@tapr.org
Message-ID: <Pine.BSI.3.91.961205102551.19471D-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi Cory:

We built a 98 MHz. low power (1 dBm) DSSS radio (BPSK) for our senior
project. My partner (N3FLA) and I actualy saw it working...

The sad part is that we got kicked out of the lab we were in into another lab
and he didn't watch power supply voltages when he hooked up and ended up
applying +20V to TTL circuitry.

We still got an A in the project, based on our report and what the TA
saw, but it would have been nice to be able to show it off to the
advisor, but there wasn't enough time to rebuild at this point.

(We were majorly behind, because it took 7 weeks to etch the circuit
boards for the RF decks!!!!! We needed to be babysat by a TA while
etching (acid etching), and most of the time it
came out either under or over etched - I hope you make out better!)

Question: How extensive does your project have to be? How much of
a "research" component do you have to put into it? Besides losing a lot
of time with the etching, our advisor forced us to do a lot of reading in
Dixon and other SS texts, further taking away from design and building
time.

I guess my message is, you can design and build a simple NE602/NE605/MMIC
based DSSS system in 6 months with plenty of time to waste. However, if I
had to do it again, I'd go for a FHSS system on 6 meters. Around here
(central Massachusetts), I'd be surprised if spectral utilization ever
got beyond 1%! In my opinion 6 meters would be the ideal band for a FHSS
system (easy to build antennas and circuits, no need to be above tree
lines, no need to watch feedline loss - all the "nuisances" of working with
UHF/microwave go away).

73

Bernie

33. Horz Omnis

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 5 Dec 1996 10:29:35 -0600
To: " Spread Spectrum "<ss@tapr.org>
Message-ID: <v0300780baecca7fb16a0@[208.134.134.42]>
Rendered body type: text/plain

There has been some discussion regarding horz slot antennas for the 900Mhz
stuff plus the other bands to help communications, since most users on are
shared bands are running vertical.

Bob Morgan, WB5AOH, (on the list) has been looking at building one but I
was wondering if someone has designs for one or can point to reference that
discuss constrution and theory.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

34. Re: [SS:613] Re: SS below 70cm?

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 5 Dec 1996 10:41:25 -0600
To: ss@tapr.org
Message-ID: <v0300780caecca90354e4@[208.134.134.42]>
Rendered body type: text/plain

Two short comments.

>I'm interested in creating a high performance amateur SS WAN, and see no
>need to go anywhere near frequencies justifiably used by other amateurs
>to do it. I see no need to even take the risk of causing interference,
>and believe any well utilised SS system MUST operate above the noise
>floor if it is to be efficent, which is what we want. I see no need for
>either narrow band users OR SS users to compromise on this issue. There
>is room enough for everyone, provided we dont let the microwave bands be
>lost to comercial interests.

Looking forward to reading about your designs and implementations.

>We have been given almost ideal frequencies for SS networks yet some
>people want to throw them away and fight other amateurs for spectrum
>that is much less than ideal anyway!
>
>This is what baffels me!

Why would it baffel you ?

It doesn't me. Amateur Radio is about doing what you want to do to expand
your operating knowledge, education, or interest. You believe and will
develop stuff for the higher bands -- great! There will be others that
will want to operate someplace else.

No problem. That is the great thing about amateur radio.

Now -- back to discussing more technical issues.

Instead of is it proper and all that, let's talk about designs folks.

Like how can someone design some RF to interface with the code Phil Karn
has been working for someone to test with. Phil is on the list, maybe he
can discuss what he has been working on since the ARRL and TAPR Digital
Communications Conference and hopefully we can locate some folks on this
list that can do a project.

How could system be developed for 219.

How are we going to get on 5Gigs and higher with reproducable systems and
systems that can both be maintained and handled in large numbers for both
users and networks.

Also, I would be interested ion hearing comments about how to implement
some interface to the DSP code that Frank Perkins posted the other day.
Nothing keeping us from taking that code on a faster DSP or what Phil has
running on a PC and cranking out testing systems with a RF interface.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

35. Re: [SS:606] Re: SS below 70cm?

From: doug cole <dcole@on-ramp.ior.com>
Date: Thu, 05 Dec 1996 08:45:12 -0800
To: ss@tapr.org
Message-ID: <32A6FC18.6CDC@on-ramp.ior.com>
Rendered body type: text/plain

just a tiny reality check as far as use of spectrum is concerned, it
seems to me that avionics still to this day use AM for their
modulo-format now why aren't we screaming for the FAA to madate FHSS for
the air industry ? :)
just a small reality check that's all
de N7BFS Doug Cole

ps: couldn't agree more with your arguement Robert :)

  Robert.Glassey@nmp.nokia.com wrote:
>
> >> system would be much more spectraly efficent. But we are amateurs,
> >> one reason for using simple FM is that beginners can easilly build a
> >> FM transceiver from a few chips and transistors, where we could never
> >> build a full trucked digital transceiver.
> >
> > I'd classify that as an assumption on your part rather than a "truth".
>
> > From what little I know of trunked systems, it would be relatively
> > easy to build a functional trunked radio. All that is required is to
>
> OK yes, it wouldn't be too dificult for me or perhaps you to make such a
> system, after all I do it for a living, but I haven't got the time or
> inclination to do it in my spare time. I perfer to do smaller scale
> projects that focus on perhaps one single technical aspect, which I have
> the time and interest to do. Similary a beginner might actually attempt
> a simple FM transceiver, where they wouldn't dream of trying it if they
> had to make a full systhisised trunked radio with microprocessor control
> and digital modulation and demodulation, just to get on air. They'ed
> just buy one. That would mean the death of home construction, and any
> experiance amateurs might gain in doing it. Then who would be left to
> build a SS unit?
>
> Ham radio should not be an exclusive club where only experianced
> engineers can get a licence, it's about learning, and a beginner gets
> the most immediate results if he can attach a crystal to a frequency
> multiplier chip, add a variactor across the crystal, and built a small
> PA with say 1/2 a watt output, and get on air! Or convert a land mobile
> rig in his spare time because even if he was an experiance engineer he
> doesn't want to build a transceiver from scratch, but wants something to
> play around with, try new techniques etc. The posibilities are
> limitless, and that's the way it should be. We should not make something
> as complex as a truncked radio minimum entry level, as the home brewers
> simplist choice. That would spell the end of home brew, since its easier
> to just buy the equipment, and you wouldn't be able to use anything you
> could reasonably build in your spare time, unless it was a major
> project.
>
> This is not to say that there shouldn't be high tech stuff, after all
> those with more experiance will want to do more complicated things. What
> I'm saying is that the simpler stuff is just as valid use of amateur
> radio as is the complex stuff, and should not be excluded by a few
> people with greater expriance, who perhaps see the whole band as their
> personal property and resent the existance of lower tech users. That's
> getting too eliteist for me.
>
> Lo tech, inefficent modes, or weak signal work can be just as valid a
> use of the ham bands, in accordance with the purpose amateur bands are
> allocated. They are not second class users.
>
> Yes, we cant get too carried away supporting outdate modes, but at the
> same time we dont want to set the entry level too high. As technology
> progresses, the newer modes will become as easy as the older modes so
> you might as well go for the new modes. I never built a CW transceiver,
> since a DSB transceiver way not much more complex and much more usefull.
> (since I'm not a big CW user). Then I didn't do SSB because I could get
> away with DSB.
>
> Efficency is a good argument for getting the maximum speed and number of
> users out of a SS network, but can never be used as an argument the
> claim moral superiority over other valid uses of the amateur spectrum.
> You respect them and they'll respect you, they might even join you!
>
> > My perception is that we sacrifice spectrum utility because each group
> > wants "their own" ego box repeater on the air, and if you're not a
> > member of that group, you're discuraged in subtle or overt ways from
> > using that repeater.
>
> This is unfortunate, I gather it happened here in England too, but
> thankfully most have grown out of that sort of behaviour. In New
> Zealand, my original QTH, repeater contruction was often coordinated on
> a national level, and roaming activity was encouraged, and several
> repeaters were built specifically for the purpose of repeater DX! One I
> was involved in could often make contacts over 1000km on 2m, and used
> two seperate phased array antennas for diversity with microprocessor
> control. Today a national system of 70cm repeaters links the entire

> country, with some sections of the link now going digital (and trunked)
> over a 700kbps link. The beginner can still access it with his 'crystal
> set' though. I once cobbled together a 70cm transciever out of spare
> test equipment and modules and made a contact over 1000km using the
> link. Thats no major task, but its fun to do!
>
> 73's,
>
> Rob

36. Re: [SS:615] Horz Omnis

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Thu, 5 Dec 1996 10:26:47 -0800 (PST)
To: ss@tapr.org (Greg Jones, WD5IVD)
Message-ID: <199612051826.AA136670408@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Greg wrote:

> There has been some discussion regarding horz slot antennas for the 900Mhz
> stuff plus the other bands to help communications, since most users on are
> shared bands are running vertical.
>
> Bob Morgan, WB5AOH, (on the list) has been looking at building one but I
> was wondering if someone has designs for one or can point to reference that
> discuss constrution and theory.

Steven Bell, kb7trz presented a paper and now has a web page (which I don't seem to have a bookmark for) regarding design and construction of waveguide slot antennas. Guide gets a bit large at 900 MHz but is probably not out of the question. Appropriate rain gutter stock might even work. He also has a mathcad 6.0 program for designing such antennas given the guide dimensions. I do have a copy of that here locally.

He recently posted this information on the sbms microwave reflector.

Glenn n6gn

37. Re: [SS:615] Horz Omnis

From: cestey@millcomm.com (Carl Estey)
Date: Thu, 05 Dec 1996 17:10:39 -0600
To: ss@tapr.org
Message-ID: <m0vVmvW-000MbcC@mill2.millcomm.com>
Rendered body type: text/plain

Greg, WD5IVD, wrote:

[snip]

>Bob Morgan, WB5AOH, (on the list) has been looking at building one but I
>was wondering if someone has designs for one or can point to reference that
>discuss constrution and theory.

What are the power restrictions under the STA in the 900-Mhz band? Has anyone done anything with homebrewing PAs? How critical is the switching time of some of the hybrid devices available? This might be a cheap way out instead of the six hundred buck commercial amp I heard about? How good are the receivers (sensitivity) on the Beta Test group units?

73
Carl
Carl Estey, Amateur Radio Station WA0CQG
10021 Drew Ave. S., Bloomington, MN 55431-2727 (612) 835-0056/ 0067
E-Mail: cestey@millcomm.com or wa0cqg@wa0cqg-uhf.ampr.org
Digital Frequency Coordinator - Metropolitan Minneapolis/St. Paul area

38. Re: [SS:619] Re: Horz Omnis

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Thu, 5 Dec 1996 21:46:07 -0600
To: ss@tapr.org
Message-ID: <v03007803aecd46eb5cfe@[208.134.134.42]>
Rendered body type: text/plain

>Greg, WD5IVD, wrote:
>
>[snip]
>

>>Bob Morgan, WB5AOH, (on the list) has been looking at building one but I
>>was wondering if someone has designs for one or can point to reference that
>>discuss constrution and theory.
>
>What are the power restrictions under the STA in the 900-Mhz band? Has
>anyone done anything with homebrewing PAs? How critical is the switching
>time of some of the hybrid devices available? This might be a cheap way out
>instead of the six hundred buck commercial amp I heard about? How good are
>the receivers (sensitivity) on the Beta Test group units?

Current power rules apply for SS on 900Mhz. Those rules were not wavied.

http://www.tapr.org/ss/rules.html see section 97.311(g)

What was waived can be found in:

http://www.tapr.org/ss/tapr_ss_sta.html

I'll let some others comment on the amp issues.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

39. Re: [SS:610] Interest in a Senior Project

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 5 Dec 1996 20:15:10 -0800 (PST)
To: clh10@po.cwru.edu (clh10@po.cwru.edu)
Cc: ss@tapr.org
Message-ID: <199612060415.UAA20094@servo.qualcomm.com>
Rendered body type: text/plain

In my opinion, one of the most useful hardware projects in this area
would be a general purpose digital software radio. That is, a radio in
which as much of the back end as possible is replaced by software
and/or dedicated DSP hardware. This is now a common industry
technique, including IS-95 CDMA equipment.

Phil

40. Re: [SS:613] Re: SS below 70cm?

From: Phil Karn <karn@qualcomm.com>
Date: Thu, 5 Dec 1996 21:20:53 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612060520.VAA20245@servo.qualcomm.com>
Rendered body type: text/plain

Rob,

I actually agree with much that you say. 2m is probably not the place
for a large-scale SS packet radio computer network that could perhaps
be better built on 1.2 or 2.4 GHz.

Yet SS can support much more than packet radio as it is traditionally
understood in the amateur service. In particular, systems like IS-95
CDMA can be directly adapted to provide FM-repeater-like land mobile
voice services with much greater spectral efficiency. Isn't this
something of the *most* potential interest on our most congested FM
bands, e.g., 2m?

It's easy to say that spectral efficiency is "unimportant" in the
amateur service if a) you don't believe that threats to amateur
spectrum are real and b) you're one of the lucky few who got a
dedicated 2m repeater pair in a major metropolitan area before the
allocations ran out 20+ years ago. If you'll pardon my language, this
strikes me as a classic "f*** you Jack, I'm all right" attitude.

I have said this before: de-facto practice notwithstanding, no one
owns any particular frequency in the amateur service. Having been
there first doesn't make any difference. All frequencies are open to
all hams licensed to operate on them, and all hams must cooperate in
using them most effectively. It says as much in Part 97 and on the
bottom of the form 610 you sign for your US ham ticket.

On the weak signal side, my goal is not to blanket the 2m weak signal band with indiscriminate strong SS signals, but to enable the use of forward error correction to enhance the DX operations that already go on there. The problem is that the same bandwidth limits that preclude the SS operations that may not make sense in the DX bands also work to preclude the potentially advantageous use of forward error correction. That's because FEC must either increase bandwidth or reduce throughput in order to work its greatest power gains. Particularly if you're interested in digital voice, which has certain minimum data rate requirements, there is no easy way to apply FEC without running into the existing bandwidth limits.

Phil

41. Re: [SS:619] Re: Horz Omnis

From: Jeff King <jeff@mich.com>
Date: Fri, 06 Dec 1996 03:23:53 -0500
To: ss@tapr.org
Cc: cestey@millcomm.com
Message-ID: <2.2.32.19961206082353.006f9098@mich.com>
Rendered body type: text/plain

Correct me if I get anything wrong Greg.

At 05:15 PM 12/5/96 -0600, Carl Estey wrote:

>What are the power restrictions under the STA in the 900-Mhz band?

I believe its 100watts output.

>Has
>anyone done anything with homebrewing PAs? How critical is the switching
>time of some of the hybrid devices available?

You mean the cell phone bricks? I'd say you'd want 200us or less switching time.

>This might be a cheap way out
>instead of the six hundred buck commercial amp I heard about? How good are
>the receivers (sensitivity) on the Beta Test group units?

Sensitivity is -110db on the reciever. Bandwidth of the hopped signal is about 200khz. I believe there are 115 or so 'channels' it can hop to across 902-928mhz.

-Jeff

42. [SS:616] Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 6 Dec 96 12:14:22 +0000
To: ss@tapr.org
Message-ID: <H000029202ef49ef@MHS>
Rendered body type: text/plain

Greg wrote:

> Looking forward to reading about your designs and implementations.

Most of the phD stuff was theoretical relating to multipath and propagation, but there were two SS systems I was involved in (not related to work):

The most unusual was adding DSSS to standard FM. Here the chip clock was derived from the the carrier frequency using a prescaler, and at the receiver an early-late corrolator was used to control a VCO which the RX DSSS sequence was derived from. Also the demodulated FM could be taken from the VCO control line! I wasn't directly involved in the construction of this, but it was an interesting project to be associated with.

The other was a more conventional DSSS system, which was more construction than theory. The heart of the RX was a synchronous oscilator which locked the chip rate to the demodulated data rate. When it was out of lock the sync oscilator wandered untill corrolation was hit, then the despread data edges locked the sync oscilator. This was a spare time project with a few guys at work, and we had the main baseband and IF parts of it going on the bench but I left the company before we got it onto RF, we intended to use the 900MHz ISM band. We looked at several types of syncing architectures but the syncronous oscilator was

the easiest for a first hack. Of course it was far from an optimum system.

I've also played around a bit with the Cylink 900MHz SS boxes a while back, and more recently have taken an interest in IS-95.

> >We have been given almost ideal frequencies for SS networks yet some
> >people want to throw them away and fight other amateurs for spectrum
> >that is much less than ideal anyway!
> >
> >This is what baffels me!

> It doesn't me. Amateur Radio is about doing what you want to do to
> expand your operating knowledge, education, or interest.
> You believe and will develop stuff for the higher bands -- great!
> There will be others that will want to operate someplace else.
> No problem. That is the great thing about amateur radio.

Yeah, OK, you have a point, it just seems like wasted effort that causes a lot of unnessesary agro, when you could be gaining support and retaining valuable bands.

Cheers,

Rob

43. Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Fri, 6 Dec 96 12:15:04 +0000
To: ss@tapr.org
Message-ID: <H000029202ef7bd5@MHS>
Rendered body type: text/plain

Phil wrote:
> I actually agree with much that you say. 2m is probably not the place
> for a large-scale SS packet radio computer network that could perhaps
> be better built on 1.2 or 2.4 GHz.

Thanks. Yip, I reckon this is definatly the way to go for a data network, I reckon this is an area of massive potential for ham radio.

> Yet SS can support much more than packet radio as it is traditionally
> understood in the amateur service. In particular, systems like IS-95
> CDMA can be directly adapted to provide FM-repeater-like land mobile
> voice services with much greater spectral efficiency. Isn't this
> something of the *most* potential interest on our most congested FM
> bands, e.g., 2m?

> allocations ran out 20+ years ago. If you'll pardon my language, this
> strikes me as a classic "f*** you Jack, I'm all right" attitude.

OK I see your point here, the situation is obviously a little different there compared to what I have experianced. It doesn't seem very good if you have all the repeater channels in an area allocated and only enough activity to justify a few. In this situation it would be nice to retire some of the existing repeaters on 2m and 70cm in due course and replace them with a IS-95 type system, while still leaving a reasonable base of FM repeaters, and not touching parts of the band where a high noise floor would be a potential problem (even if it isn't in 99% of real cases). We would need to get commercial support (eventually) from the big 3 (or someone else) to produce IS-95 handhelds etc.

It still seams easier to do this on higher bands, and leave 2m repeaters to die a natural death in the face of competition.

I agree this monopoly of allocated frequency for a dozen unnessesary repeaters is not very good, and your quote sounds like it is appropriate!

> On the weak signal side, my goal is not to blanket the 2m weak signal
> band with indiscriminate strong SS signals, but to enable the use of
> forward error correction to enhance the DX operations that already go
> on there. The problem is that the same bandwidth limits that preclude
> the SS operations that may not make sense in the DX bands also work to
> preclude the potentially advantageous use of forward error
> correction.

How wide? of course with DX you want to put as much power into the air as possible, to go that last mile. This would be the whole point of

using FEC on a DX link, it wouldn't be used to allow reduced TX power,
but rather to make better use of the power you already have.

So how wide? Would it be possible (regulations permitting) to allocate a
small segment say 100kHz wide to SS-DX? Chanalised into say 25kHz
channels to allow different TX and RX from nearby sites. Perhaps it
would be better to allocate these channels as far from each other as
possible, squeezed in where they might fit. It a coordinated proposal as
submitted to the FCC/frequceny coordinators could the regulations and
allocations be changed to allow this?

Perhaps specific proposals might have better success than generally
asking for allocations that would allow anyone "to blanket the 2m weak
signal band with indiscriminate strong SS signals" wheather the intended
to or not.

> That's because FEC must either increase bandwidth or
> reduce throughput in order to work its greatest power
> gains.

One thing I like about SS and FEC is that your extra FEC data only costs
you processing gain, but gives a lot more in return. It seems possible
to apply FEC as the last step in the despeading to acheive much better
Eb/No performance. Its like the FEC comes for free with SS.

Cheers,

Rob

44. Re: [SS:615] Horz Omnis

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 06 Dec 96 08:20:15 UTC
To: ss@tapr.org
Message-ID: <11579@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Greg, Glen, others ?

   Horizontal polarisation gives me the willies, hi. I remember when we
used the same logic, that all the other inband activity was vertical, on our
first 220/9600 baud link. Turns out, we opened up a whole new can of worms.
By exposing the RF to 20 dB stronger TV noise, some distance away in the
spectrum, we ended up with a Image response problem instead.

   Has anybody checked the first IF freq, and LO injection side? To see what
TV stations would be at Image frequencies? And, of course, there is radar
up higher, FAA radar. Which is usually horizontally polarised as well. Its
just above a Ghz, typically. Our Manhattan, IL site sees the southern FAA
terminal control area radar for Ohare Airport, hi!

   Back in 1986, We went back vertical, and had no more problems.

   BTW, I have completed a 915 Mhz prototype microstrip patch antenna with
good results. Email me for more details. This antenna can be used vertical
or horizontally polarized. Simply by tipping it sideways, hi. Its a single
patch. Which is the electrical dual to a 2 slot array, only unidirectional.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

45. Re: [SS:621] Re: Interest in a Senior Project

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 6 Dec 1996 08:00:24 -0800 (PST)
To: ss@tapr.org (Phil Karn)
Message-ID: <199612061600.AA205118025@hpsadr2.sr.hp.com>
Rendered body type: text/plain

Phil

> In my opinion, one of the most useful hardware projects in this area
> would be a general purpose digital software radio. That is, a radio in
> which as much of the back end as possible is replaced by software
> and/or dedicated DSP hardware. This is now a common industry
> technique, including IS-95 CDMA equipment.

this is just about exactly the charter I have placed on L3TNCRF, further
described on my web pages. However, getting time to get it into
distributable form is difficult for me.

Glenn n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

|--------------- N6GN's Higher Speed Packet WWW Page -------------------|
| |
| http://www.tapr.org/~n6gn/index.html |

46. Re: [SS:623] Re: Horz Omnis

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 6 Dec 1996 08:11:44 -0800 (PST)
To: ss@tapr.org (Jeff King)
Message-ID: <199612061611.AA236908704@hpsadr2.sr.hp.com>
Rendered body type: text/plain

> >Has
> >anyone done anything with homebrewing PAs? How critical is the switching
> >time of some of the hybrid devices available?
>
> You mean the cell phone bricks? I'd say you'd want 200us or less switching
> time.
>
> >This might be a cheap way out
> >instead of the six hundred buck commercial amp I heard about? How good are
> >the receivers (sensitivity) on the Beta Test group units?

The Mitsubisha/Toshibi/Matsushita driver/PA/T-R modules I used in the
230 kbps 904 MHz FSK radios were quite inexpensive. Up to the output
stage they are linear with the two last devices biased class C but these
can be rebiased for linear operation, as I've already done for OCAR use.
The entire power train and T-R switch can turn around in under 10 us
using only 3 terminal regulators as bias switches.

However, I don't understand why adding 10-20 dB of transmit power gain
is a useful endeavor compared to the alternatives. If 1 watt isn't
enough for your link, either the path or something in the hardware is
extremely bad.

On the receive side, 3 dB noise figure is really about all that is
necessary for a terrestrial link. The antenna temperature is at about
that level and improvements beyond this level in the receive preamp are
not particularly rewarded. Additional gain *is* likely to increase
distortion products in downstream stages; mixers and IF amplifiers.

All in all, I don't think that additional gain on either transmit or
receive is normally a very good place to first look to start improving
the system.

Glenn n6gn

47. Re: [SS:626] Re: Horz Omnis

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 6 Dec 1996 08:27:16 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612061627.AA261889637@hpsadr2.sr.hp.com>
Rendered body type: text/plain

>From Don:
>
>   Horizontal polarisation gives me the willies, hi. I remember when we
> used the same logic, that all the other inband activity was vertical, on our
> first 220/9600 baud link. Turns out, we opened up a whole new can of worms.
> By exposing the RF to 20 dB stronger TV noise, some distance away in the
> spectrum, we ended up with a Image response problem instead.
>

 I've run both polarizations over the years on most of the vhf-microwave
bands, in different circumstances. We used polarization diversity
briefly to try and reduce some ISM QRM at 900 MHz. In general, any

improvements due to picking a specific polarizaion around here have been
fairly small to unnoticable.

There is some theoretical basis for preferring or rejecting horizontal
polarization under certain conditions. In situations where potential
interferers are LOS and the polarization of their signals has
not yet been corrupted by diffraction and scattering (perhaps as in your
TV example) running orthogonal to them can be useful. However, around here,
it hasn't generally proved to be all that useful.

If the radio systems have poor out-of-band rejection or poor large
signal perfomance those problems should probably be corrected at
somewhere besides the antenna anyway. If the signals are in-band,
antenna directivity is often more useful than relying on polarization
isolation to reduce the interferring signals. In addition, many
antennas which have a given polarization in the main beam exhibit
significant orthogonal polarizations off the sides or back.

Glenn n6gn

48. Re: [SS:622] Re: SS below 70cm?

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Fri, 6 Dec 1996 10:04:23 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.961206095006.726A-100000@tekdata.com>
Rendered body type: text/plain

Actually, from an engineering standpoint, I kinda think FHSS is the way to
go on 6m, 2m, & 220.. but I think it would be nice for it to be legal
to do DSSS also.

On FHSS, just use unused or underused NB channels...

Oh DSSS--
52 MHz is a very do-able range for even TTL parts. I would suspect it
could be a good IF for DSSS rigs that eventually are transverted to
microwave, but there is a bit of an advantage to be allowed to try it
out before knocking it up to microwave...

Also remember some of us are "flatlanders" and there is often a terrain
issue with microwave. I don't think my neighbors would like more than
one dish on top of my house! VHF and UHF have the advantage of traveling
reasonably through trees, etc... I see use for both microwaves and
VHF/UHF with SS..

I do agree that utilization of the Microwave bands is more vital to
ham radio than SS is at all. But that's a Apple to Orange comparison!

Fred M. Spinner, KA9VAW
fred@tekdata.com, ka9vaw@amsat.org

49. Re: [SS:628] Re: Horz Omnis

From: Jeff King <jeff@mich.com>
Date: Fri, 06 Dec 1996 14:01:12 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19961206190112.006ca7d0@mich.com>
Rendered body type: text/plain

At 10:12 AM 12/6/96 -0600, Glenn Elmore wrote:

>The Mitsubisha/Toshibi/Matsushita driver/PA/T-R modules I used in the
>230 kbps 904 MHz FSK radios were quite inexpensive. Up to the output
>stage they are linear with the two last devices biased class C but these
>can be rebiased for linear operation, as I've already done for OCAR use.
>The entire power train and T-R switch can turn around in under 10 us
>using only 3 terminal regulators as bias switches.

They have a web site and/or distributor? Interested in those.

>
>However, I don't understand why adding 10-20 dB of transmit power gain
>is a useful endeavor compared to the alternatives. If 1 watt isn't
>enough for your link, either the path or something in the hardware is
>extremely bad.

Yes, true. But putting the amplifier/pre-amp at the antenna allows
you to use less expensive coax. This often can pay for the additional
price of the amp (9913 vs. LMR-600). Also, 10-20db is often the difference

between a good path and a unusable path. Remember that foilage loss at
900mhz is considerablly more then at 2 metres. Getting antennas at
"line of sight" at 900mhz is harder then 2 metres because the 900mhz
antennas can't "see" through trees as well as 2 metres. Also, many of
us don't live in areas that have easy line of sight paths and/or that
are heavily wooded (like Michigan :-(.

-Jeff wb8wka

50. Syncronizing SS systems?

From: wpns@world.std.com (William Smith)
Date: Fri, 6 Dec 1996 14:19:42 -0500 (EST)
To: ss@tapr.org
Message-ID: <199612061919.AA15496@world.std.com>
Rendered body type: text/plain

Robert.Glassey@nmp.nokia.com sez:

>The most unusual was adding DSSS to standard FM. Here the chip clock was

>construction than theory. The heart of the RX was a synchronous
>oscilator which locked the chip rate to the demodulated data rate. When
>it was out of lock the sync oscilator wandered untill corrolation was
>hit, then the despread data edges locked the sync oscilator. This was a

>several types of syncing architectures but the syncronous oscilator was
>the easiest for a first hack. Of course it was far from an optimum

How _do_ you syncronize SS systems, how long does it take to 'lock',
and how long are you unlocked if something goes wrong?

>I've also played around a bit with the Cylink 900MHz SS boxes a while
>back, and more recently have taken an interest in IS-95.

What's IS-95?

--
Willie Smith wpns@world.std.com N1JBJ@amsat.org
#define NII Information SuperCollider

51. good reference books for Barker codes.

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Fri, 6 Dec 1996 15:22:29 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.961206152146.2138F-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi:

Is there a good reference book for Barker Codes that you might be able to
recommend?

Bernie

52. Re: [SS:631] Re: Horz Omnis

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Fri, 6 Dec 1996 12:48:11 -0800 (PST)
To: ss@tapr.org (Jeff King)
Message-ID: <199612062048.AA226405291@hpsadr2.sr.hp.com>
Rendered body type: text/plain

k
Jeff wb8wka wrote:

> (I wrote)
> >The Mitsubisha/Toshibi/Matsushita driver/PA/T-R modules I used in the
> >230 kbps 904 MHz FSK radios were quite inexpensive. Up to the output
> >stage they are linear with the two last devices biased class C but these
> >can be rebiased for linear operation, as I've already done for OCAR use.
> >The entire power train and T-R switch can turn around in under 10 us
> >using only 3 terminal regulators as bias switches.
>
> They have a web site and/or distributor? Interested in those.

  RF Parts seems to have a pretty good supply of modules; drivers and
PAs and a limited supply of PIN T/R switches. Mitsubishi has been
promising to get stateside warehousing of these parts but I haven't
heard for sure that they have succeeded.

> Yes, true. But putting the amplifier/pre-amp at the antenna allows
> you to use less expensive coax. This often can pay for the additional
> price of the amp (9913 vs. LMR-600). Also, 10-20db is often the difference
> between a good path and a unusable path. Remember that foilage loss at
> 900mhz is considerablly more then at 2 metres. Getting antennas at
> "line of sight" at 900mhz is harder then 2 metres because the 900mhz
> antennas can't "see" through trees as well as 2 metres. Also, many of
> us don't live in areas that have easy line of sight paths and/or that
> are heavily wooded (like Michigan :-(.

It's true that line loss can be important, and with 2 dB of system degradation per db of line loss it holds even more importance than straight transmit power or receive noise floor alone since it applys to both transmit and receive. I've made many measurements of path loss of amateur links at 2M through 3cm and I've been operating in, around and through trees at 900 MHz for ~7 years, 24 hours/day. However, I still hold that adding excessive transmit power or receive gain is normally not addressing the "big ticket items".

Please see:

http://www.tapr.org/~n6gn/dcc/problem.html

for my response and support for this view.

Glenn n6gn

53. Re: [SS:633] good reference books for Barker codes.

From: Charles Brain <chbrain@dircon.co.uk>
Date: Fri, 06 Dec 1996 21:35:45 +0000
To: ss@tapr.org
Message-ID: <1.5.4.32.19961206213545.0066b234@popmail.dircon.co.uk>
Rendered body type: text/plain

At 14:23 06/12/96 -0600, you wrote:
>Hi:
>
>Is there a good reference book for Barker Codes that you might be able to
>recommend?
>
>Bernie
>
>
>
>
Try the back of the ARRL SS Sourcebook.

Regards Charles G4GUO

54. Re: [SS:617] Re: SS below 70cm?

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Fri, 6 Dec 1996 17:18:04 -0500
To: ss@tapr.org
Message-ID: <199612062218.RAA12017@Paris.GASD102designcenter>
Rendered body type: text/plain

> just a tiny reality check as far as use of spectrum is concerned, it
> seems to me that avionics still to this day use AM for their
> modulo-format now why aren't we screaming for the FAA to madate FHSS for
> the air industry ? :)
> just a small reality check that's all
> de N7BFS Doug Cole

How is this a reality check?

55. Re: [SS:632] Syncronizing SS systems?

From: clh10@po.cwru.edu (clh10@po.cwru.edu)
Date: Fri, 6 Dec 1996 17:55:16 -0500 (EST)
To: ss@tapr.org
Message-ID: <v01550101aece0e337d00@[129.22.249.174]>
Rendered body type: text/plain

>What's IS-95?
IS-95 is the commercial CDMA system used for Cellular communications. For more

information, you might try the following web page.
http://www.cdg.org/a_ross/CAI.html

Cory L. Hojka <clh10@po.cwru.edu>
Beta Nu of Theta Chi Fraternity
Case Western Reserve University
Cleveland, OH

56. Re: [SS:635] Re: good reference books for Barker codes.

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Fri, 6 Dec 1996 18:16:56 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSI.3.91.961206181529.605B-100000@uhf.wdc.net>
Rendered body type: text/plain

> Try the back of the ARRL SS Sourcebook.
>
> Regards Charles G4GUO
>

Hi Charles:

Are you serious? I at one point almost bought the sourcebook but people advised against it because they said it was too superficial. Maybe that statement doesn't apply to Coding. I'll try to find it around here.

Bernie

57. Re: [SS:624] Re: SS below 70cm?

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 6 Dec 1996 16:25:36 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612070025.QAA22299@servo.qualcomm.com>
Rendered body type: text/plain

Robert,

Have any of the SS systems you worked on used FEC? I'm surprised that so many commercial systems do not (including apparently the Cylink boxes). As Viterbi has said very well, FEC is absolutely free in a spread system and there is no reason (other than laziness) not to do it. And it can make a dramatic difference in performance and QRM potential.

Phil

58. Re: [SS:628] Re: Horz Omnis

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 6 Dec 1996 16:39:44 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612070039.QAA22352@servo.qualcomm.com>
Rendered body type: text/plain

>All in all, I don't think that additional gain on either transmit or
>receive is normally a very good place to first look to start improving
>the system.

I heartily agree. If anything, we need the ability to *reduce* gain on the transmit side to whatever is actually required...

Phil

59. Re: [SS:630] Re: SS below 70cm?

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 6 Dec 1996 16:51:44 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612070051.QAA22368@servo.qualcomm.com>
Rendered body type: text/plain

>Actually, from an engineering standpoint, I kinda think FHSS is the way to
>go on 6m, 2m, & 220.. but I think it would be nice for it to be legal
>to do DSSS also.

>On FHSS, just use unused or underused NB channels...

I agree, FHSS is almost certainly the way to go on these bands from an engineering standpoint. With burst-error-resistant coding, it can resist a few narrowband jammers much better than direct sequence. DS,

on the other hand, can generally achieve better Eb/N0 performance
against gaussian noise (because it's easier to demodulate coherently)
which makes it the method of choice on more controlled-access
channels, like cellular telephony.

Phil

60. Re: [SS:636] Re: SS below 70cm?

From: "Steve Sampson" <ssampson@oklahoma.net>
Date: Fri, 6 Dec 1996 19:35:36 -0600
To: <ss@tapr.org>
Message-ID: <199612070141.TAA25350@dns.okc>
Rendered body type: text/plain

> > just a tiny reality check as far as use of spectrum is concerned, it
> > seems to me that avionics still to this day use AM for their
> > modulo-format now why aren't we screaming for the FAA to madate FHSS
for
> > the air industry ? :)
> > just a small reality check that's all
>
> How is this a reality check?

I don't understand the reality-check reference either, unless you mean we
are as backwards as aviation :-)

Having flown for 14 years I find the whole aviation system an even bigger
joke than Ham radio. But it is crippled by a staggering bureaucracy. One
thing I was glad for, was the fact that we had our own radar and could
basically exit the air route system and participate in the air space
system.
One thing the Soviet and American military agreed upon, was that the
FAA was an impediment, and we did the cold war wherever we damn well
pleased :-)

I watched the Mode-S system wither on the vine, because the FAA cannot
interface to it with its tube based computers. But basically it is a
digital
link on the IFF/SIF frequency. The idea being that voice communications
was really an impediment to commercial aviation. The TCAS (Threat
Collision and Avoidance) system was projected to operate in a Mode-S
environment, but now competes with bandwidth for the old IFF/SIF system.
The reason this is bad, is that any airplane is being hit by hundreds of
other airplanes as well as the ground sites. The ground sites with Mode-S
would have cut their transmissions by 75% thus freeing up the bandwidth.

You know how an IFF/SIF system finds the azimuth of a target?

They spray through the air a continuous stream of interrogations, and then
when they start getting replies, they remember the start reply and then
when
the replies stop, they remember the last reply. The azimuth then is the
end minus the start divided by two. It works, is not very accurate, and is
very wasteful of bandwdth.

I think the "new" FAA being released into the commercial arena is probably
going to be the most exciting industry to be in. Wait ten years, and we
will
see 118 - 136 MHz being released to the public. It will be worthless for
aviation, as 2 meters is for Ham radio.

Steve

61. Re: [SS:632] Syncronizing SS systems?

From: Phil Karn <karn@qualcomm.com>
Date: Fri, 6 Dec 1996 18:56:38 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612070256.SAA22765@servo.qualcomm.com>
Rendered body type: text/plain

>How _do_ you syncronize SS systems, how long does it take to 'lock',
>and how long are you unlocked if something goes wrong?

In a DS system (which I know best), the usual method is to just search
through the whole spreading sequence looking for a correlation peak to
jump out of the noise. The speed at which you can search is a function
of the Ec/N0 (like Eb/N0, but per chip) -- the stronger the signal,
the faster you can search while remaining likely to detect the signal.

How long it takes depends on the length of the sequence and the search
rate; on average you have to search half the sequence space. In both
IS-95 and GPS there is a relatively short code that's used primarily to
aid acquisition: 32768 chips for IS-95, 1023 chips for GPS. Other, longer
sequences can be used in combination once initial synchronization has
been achieved. In the IS-95 case, it typically takes just a few seconds to
acquire synchronization, about the same time it takes a conventional AMPS/FM
phone to acquire and lock onto a paging channel.

>What's IS-95?

TIA Interim Standard 95. It describes the CDMA digital cellular air interface
that we (Qualcomm) developed. See my web page for more details:

<http://www.qualcomm.com/people/pkarn/cdma.html> and
<http://www.qualcomm.com/>

--Phil

62. Re: [SS:629] Re: Horz Omnis

From: wb9mjn@wb9mjn.ampr.org
Date: Fri, 06 Dec 96 22:13:06 UTC
To: ss@tapr.org
Message-ID: <11609@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Glenn,

   On 220/9600 and Channel 11 TV problem. We were a few miles , sky scraper
top to sky scrapper top from the Channel 11 transmitter antenna.

   TV antennas are usually omni, so they would be expected to have similar
orthogonal polarisation performance in all the azimuthal directions. The same
for 2 way style colinears. So, in this case, polarisation isolation was
used.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

63. Re: [SS:638] Re: good reference books for Barker codes.

From: Charles Brain <chbrain@dircon.co.uk>
Date: Sat, 07 Dec 1996 08:50:52 +0000
To: ss@tapr.org
Message-ID: <1.5.4.32.19961207085052.00664884@popmail.dircon.co.uk>
Rendered body type: text/plain

At 17:23 06/12/96 -0600, you wrote:
>> Try the back of the ARRL SS Sourcebook.
>>
>> Regards Charles G4GUO
>>
>
>Hi Charles:
>
>Are you serious? I at one point almost bought the sourcebook but
>people advised against it because they said it was too superficial.
>Maybe that statement doesn't apply to Coding. I'll try to find it around
>here.
>
>Bernie
>
>
>
Yes, one of the appendicies describes in about 2 pages Barker codes. I must
admit it is about the only useful part of it.

Regards Charles

64. [SS:639] Re: SS below 70cm?

From: Robert.Glassey@nmp.nokia.com
Date: Sat, 7 Dec 96 13:05:04 +0000
To: ss@tapr.org
Message-ID: <H000029202f08f22@MHS>
Rendered body type: text/plain

Phil Wrote:

> Robert,
>
> Have any of the SS systems you worked on used FEC? I'm surprised that
> so many commercial systems do not (including apparently the Cylink
> boxes).
> As Viterbi has said very well, FEC is absolutely free in a spread
> system and there is no reason (other than laziness) not to do it. And
> it can make a dramatic difference in performance and QRM potential.

Nope, both the SS systems I was involved with were pretty basic
demonstrators. I don't know about the Cylink boxes.

But I agree FEC is well worth it for SS. When we come to making an
amateur SS WAN it should definatly be part of the standard.

Cheers,

Rob

65. Re: [SS:632] Syncronizing SS systems?

From: doug cole <dcole@on-ramp.ior.com>
Date: Sat, 07 Dec 1996 13:03:49 -0800
To: ss@tapr.org
Message-ID: <32A9DBB5.56B3@on-ramp.ior.com>
Rendered body type: text/plain

Please to whomever answers willie and any other questions about spread
spectrum please answer it through the sig , otherwise people like me who
don't know what IS-95 and all the other jargon that you engineers are
using won't be assimilated by us ignorants.....
I am very anxious to learn more about spread spectrum and put it to use
but need info in the form of email from the sig and also from any
publications that may be able to help me to learn.

thanks for all the talk so far to everyone who has submitted their
opinions I for one really do appreciate the interactions that I have
been reading on this sig !
73's
doug cole N7BFS

66. Re: [SS:634] Re: Horz Omnis

From: doug cole <dcole@on-ramp.ior.com>
Date: Sat, 07 Dec 1996 13:12:23 -0800
To: ss@tapr.org
Message-ID: <32A9DDB7.61EA@on-ramp.ior.com>
Rendered body type: text/plain

Hello Glen I was wondering about your reference of "the big ticket
items"
and being a lowly experimenter without an engineering degree or any
thing and just doing it on weekends I am not sure what those big ticket
items are....
Could you point me in the right directions as far as books that might
help me learn more about spread spectrum or high speed data
communications (as that is what I am actually interested in) for
amateur radio.

I have just decided to dive into this part of the hobby but need some
info to start on and any help you can give would be most appreciated :)

73's
Doug Cole de N7BFS

67. FEC

From: Carol Fields <fields@svpal.org>
Date: Sat, 7 Dec 1996 14:03:30 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.3.88.9612071332.A14748-0100000@svpal.svpal.org>
Rendered body type: text/plain

There was the implication that FEC (forward Error
Correction) was almost free in SS in previous messages.
What type of FEC code would you recommend and why?
Would you think a hardware or software FEC
is better for SS?
Is there a feeling that this is better than

just resending a packet?

FIELDS@SVPAL.ORG Home email account of Julian and Carol Fields.

On Sat, 7 Dec 1996 Robert.Glassey@nmp.nokia.com wrote:
> But I agree FEC is well worth it for SS. When we come to making an
> amateur SS WAN it should definatly be part of the standard.

68. Re: [SS:647] Re: Syncronizing SS systems?

From: Sjolin@aol.com
Date: Sat, 7 Dec 1996 18:22:39 -0500
To: ss@tapr.org
Message-ID: <961207182238_1487841560@emout20.mail.aol.com>
Rendered body type: text/plain

In a message dated 96-12-07 16:49:41 EST, you write:

<< am very anxious to learn more about spread spectrum and put it to use
 but need info in the form of email from the sig and also from any
 publications that may be able to help me to learn. >>

Check TAPR website. I believe it is www. tapr.org. They have an excellent
write ups by NK6K and others.

73 de Dave, N0IT

69. Re: [SS:649] FEC

From: clh10@po.cwru.edu (clh10@po.cwru.edu)
Date: Sat, 7 Dec 1996 19:16:01 -0500 (EST)
To: ss@tapr.org
Message-ID: <v01550100aecf6dd0131d@[129.22.249.174]>
Rendered body type: text/plain

>There was the implication that FEC (forward Error
>Correction) was almost free in SS in previous messages.
>What type of FEC code would you recommend and why?
>Would you think a hardware or software FEC
>is better for SS?
>Is there a feeling that this is better than
>just resending a packet?
As an example, IS-95 uses the combination of Convolutional Encoding
along with Block Interleaving. Convolutional encoding in IS-95 gives two
bits for every bit put into the Convolutional Encoder (This defines the
convolutional encoder as being of rate 1/2. If it were three bits for every
input bit, the rate would be 1/3). These two bits represent transitions
from one data state to another. Since there are only certain valid
transtions from one state to another, a wrong transition can be possibly
detected and corrected. The other
technique is interleaving. Data is entered row by row into an array of I
rows and J columns, it is then taken out by column. (This method
is known as Block Interleaving.) The reverse of this process is done at the
receiver.The importance of interleaving is that it spreads the effect of
noise over an entire packet. So if noise is at the beginning of the block
of data,
it would affect x1, x1+j, x2+j, etc. Rather than x1, x2, x3.

So, with Convolutional Encoding and Block Interleaving, the effect on our
transmission of data in IS-95 is to increase the data rate from 9.6 kbps
to 19.2 kbps (affect of CE) and impose a delay of IJ (affect of having to
fill the matrix in BI). Not much of a price to pay for enhanced error
correction.

If you are not afraid of theory, Viterbi's CDMA: Principles of Spread Spectrum
Communications is a good book for an overview of CDMA techniques.

Cory L. Hojka   <clh10@po.cwru.edu>
Beta Nu of Theta Chi Fraternity
Case Western Reserve University
Cleveland, OH

70. Re: [SS:645] Re: good reference books for Barker codes.

From: Phil Karn <karn@qualcomm.com>
Date: Sat, 7 Dec 1996 17:02:23 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612080102.RAA07646@servo.qualcomm.com>
Rendered body type: text/plain

A good reference book I recommend is

Multiple Access Communications: Foundations for Emerging Technologies

It's an IEEE reprint collection edited by Norman Abramson. ISBN 0-87942-292-0.

It leads off with the classic Costas paper Poisson, Shannon and the Radio
Amateur.

The book contains a whole section on spread spectrum CDMA. It also
includes Barker's original 1953 paper and a followup by Golomb and
Scholtz in 1965 that generalized Barker sequences.

Phil

71. Re: [SS:649] FEC

From: Phil Karn <karn@qualcomm.com>
Date: Sat, 7 Dec 1996 18:27:55 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612080227.SAA07785@servo.qualcomm.com>
Rendered body type: text/plain

>There was the implication that FEC (forward Error
>Correction) was almost free in SS in previous messages.
>What type of FEC code would you recommend and why?
>Would you think a hardware or software FEC
>is better for SS?
>Is there a feeling that this is better than
>just resending a packet?

Yes, FEC is "free" in a spread spectrum system in the sense that SS always
performs better with FEC than without it given the same bandwidth and RF
power. Andrew Viterbi has written an excellent article on this exact point;
it appeared in IEEE Communications Magazine for May 1979 and is included
in the Abramson collection I mentioned earlier.

The best kind of FEC depends on the kind of SS. For direct sequence,
convolutional coding is probably the best. Interleaving will help deal
with pulsed interference and fading. Other codes could be layered on
top of the basic convolutional code, such as a Reed-Solomon code or
a simple block CRC with retransmission. We use the latter for packet data
over IS-95.

For frequency hopping, the requirements change somewhat, particularly
in the presence of a few scattered narrowband jammers: the code must
have excellent performance against the burst of errors that occur when
the hopper lands on a narrowband interferer. A suitably interleaved
convolutional code can again work here, though direct use of
Reed-Solomon coding is also possible because of its inherent
resistance to burst errors without interleaving. Also, frequency
hopped systems often use higher order (non-binary) signalling
alphabets such as M-ary FSK, and these are a simple match to the
Reed-Solomon codes which are also non-binary. E.g., a 256-ary FSK
system is a nice match to a (255,x) RS code over GF(256) since each
FSK "tone" maps directly to one 8-bit RS symbol.

There is no question that low-level FEC is much more powerful than
just resending a packet. This is not to say that retransmission has no
place in the system; as I mentioned above, it's part of the CDMA
packet data system that I developed at Qualcomm. It's just that while
retransmission is good at taking a low error rate and reducing it
essentially to zero, FEC is much better at taking a high error rate
and reducing it to a low (but not zero) level. The two together thus
make a very natural combination.

Phil

72. Re: [SS:650] Re: Syncronizing SS systems?

From: "Steven R. Bible" <srbible@gnatnet.net>
Date: Sun, 08 Dec 1996 20:22:46 -0500
To: ss@tapr.org
Message-ID: <1.5.4.32.19961209012246.00696ea8@gnatnet.net>
Rendered body type: text/plain

At 05:25 PM 12/7/96 -0600, you wrote:
>In a message dated 96-12-07 16:49:41 EST, you write:
>
><< am very anxious to learn more about spread spectrum and put it to use
> but need info in the form of email from the sig and also from any

> publications that may be able to help me to learn. >>
>
>Check TAPR website. I believe it is www. tapr.org. They have an excellent
>write ups by NK6K and others.

Actually, It was I (N7HPR) as guest columnest for NK6K. The piece "Spread Spectrum -- It's not just for breackfast anymore!" is posted at:

    http://www.tapr.org/ss/qexss.html

It average >200 hits a week. Quite a surprise considering its humble beginnings. One of these days I hope to update it.

Other Amateur Spread Spectrum information is available at:

    http://www.tapr.org/ss/

73,

 - Steve, N7HPR
 (n7hpr@tapr.org)

73. Wireless Networking built into PC's

From: Steve Stroh <strohs@halcyon.com>
Date: Sun, 8 Dec 1996 21:18:26 -0800 (PST)
To: TAPR Spread Spectrum SIG Mailing List <ss@tapr.org>
Message-ID: <Pine.ULT.3.95.961208205513.15349C-100000@coho.halcyon.com>
Rendered body type: text/plain

I picked up a new magazine at the newsstand- "boot", subtitled "For the PC Fanatic", the December 1996 issue. It's mostly about bleeding-edge PC-based gaming, but it has a lot of energy and fun, and some surprisingly good technical content. For more info check out http://www.bootnet.com.

In an interview with Rod Schrock, Compaq's vice president in charge of the Presario line of home PC's, the following quote caught my eye:

boot: What is the single most important technology on the horizon?

Schrock: I'd have to say the technology with the most appeal is something that hasn't been talked about too much yet, and that's the in-home network. Our strategy is to design into our PCs, by 1998, in-home wireless networking. That will let you bring all that media-rich content in over the Net, or however, and distribute it throughout the home. It will enable the digital home. We won't have a bunch of isolated boxes anymore.

Obligatory SS content: Such a system would almost have to be SS.

That quote hit me between the eyes like a 2x4. A criticism I've had of PC companies for a long time is why didn't a vendor like Intel, Dell, Compaq, etc. just have the courage to put an Ethernet adapter on the motherboard on every one of their PC's. It seems to me that it would be even simpler to put a simple wireless tranceiver onboard, and run it almost completely in software from the excess processing power on the Pentium/Pro/MMX processor (which should, by this point, be labelled "The KA9Q approach").

All sorts of things that could have Compaq-compatible wireless comms added to them: thermostats, sprinklers, lighting circuits, weather stations, music systems, intercoms, major appliances, the possibilities are endless.

I have no doubt that Compaq can pull it off. Compaq was one of the first PC makers to make a commitment to the home PC market not because it was profitable but because it was hard- it's a challenge to stay ahead of the consumer market and the mindset that requires infuses the rest of the company with a sense of urgency and drive to be cost competitive.

I agree with them- on reflection it makes SO much sense to do things around a home wirelessly rather than drilling holes and cabling ad infinitum. Putting the PC in the center of the home control system is a leap forward also- couple the wireless networking possibilities with speech recognition made possible with the MMX.

Steve N8GNJ

--
Steve Stroh Woodinville, Washington, USA strohs@halcyon.com

74. Re: [SS:654] Re: Syncronizing SS systems?

From: Sjolin@aol.com
Date: Mon, 9 Dec 1996 01:21:28 -0500
To: ss@tapr.org
Message-ID: <961209012127_1786192643@emout06.mail.aol.com>
Rendered body type: text/plain

In a message dated 96-12-08 20:58:02 EST, you write:

<< Actually, It was I (N7HPR) as guest columnest for NK6K. The piece "Spread
 Spectrum -- It's not just for breackfast anymore!" is posted at:

     http://www.tapr.org/ss/qexss.html

 It average >200 hits a week. Quite a surprise considering its humble
 beginnings. >>

Sorry about that Steve. Great article! Even I understood most of it.
73 de Dave, N0IT

75. Re: [SS:648] Re: Horz Omnis

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Mon, 9 Dec 1996 06:39:12 -0800 (PST)
To: ss@tapr.org (doug cole)
Message-ID: <199612091439.AA216372352@hpsadr2.sr.hp.com>
Rendered body type: text/plain

>
> Hello Glen I was wondering about your reference of "the big ticket
> items"
> and being a lowly experimenter without an engineering degree or any
> thing and just doing it on weekends I am not sure what those big ticket
> items are....
> Could you point me in the right directions as far as books that might
> help me learn more about spread spectrum or high speed data
> communications (as that is what I am actually interested in) for
> amateur radio.
>
> I have just decided to dive into this part of the hobby but need some
> info to start on and any help you can give would be most appreciated :)

Doug,
  Hi Doug, don't be put off by the apparantly foreign language that gets
used here at times and by all means, jump in as you are interested.
  I don't know that I can give you a particularly good bibliography of
SS, I think that there are now a at least a few texts with considerable
detail and others with a lot of introductory material. You might start
with the ARRL book and a listen to the introductory session at the most
recent DCC. It's audio is available on the TAPR pages I think. Others on
this list may have further suggestions.

  To (hopefully) clear up ambiguity in my previous "big ticket item"
reference, please start with
http://www.tapr.org/~n6gn/index.html
and see if that helps. The "What's the Problem" section is taken in
part from an attempt I made at the most recent conference to uncover
some of these issues.

73
Glenn Elmore n6gn

amateur IP: glenn@SantaRosa.ampr.org
Internet: glenne@sr.hp.com

76. Re: [SS:618] Re: Horz Omnis (fwd)

From: Glenn Elmore <glenne@hpsadr2.sr.hp.com>
Date: Mon, 9 Dec 1996 07:14:31 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612091514.AA258374471@hpsadr2.sr.hp.com>
Rendered body type: text/plain

I found the URL to the slot antenna information which Steven Bell, kb7trz presented.

http://192.82.208.21/employees/byee_engr/slot_ant.html

The MathCad program should be there as well.

Glenn n6gn

77. Java Web Site

From: John Melton <john@images.demon.co.uk>
Date: Mon, 09 Dec 1996 20:28:41 +0000
To: ss@tapr.org
Message-ID: <32AC7679.7FFF9747@images.demon.co.uk>
Rendered body type: text/plain

Hi,

I am setting up a Web Site with information on the use of Java in
Ham Radio.

If you are doing any development using Java for Ham radio, let
me know and I will put the information on my the web site.

Thanks,

John Melton, g0orx/n6lyt

john@images.demon.co.uk

78. Re: [SS:655] Wireless Networking built into PC's

From: George Cserenyi <zsolt@direct.ca>
Date: Mon, 9 Dec 1996 13:40:10 -0800 (PST)
To: Steve Stroh <strohs@halcyon.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.91.961209133545.9465A@boxer.direct.ca>
Rendered body type: text/plain

On Mon, 9 Dec 1996, Steve Stroh wrote:

>
> I picked up a new magazine at the newsstand- "boot", subtitled "For the PC
> Fanatic", the December 1996 issue. It's mostly about bleeding-edge
> PC-based gaming, but it has a lot of energy and fun, and some surprisingly
> good technical content. For more info check out http://www.bootnet.com.
[...]
> That quote hit me between the eyes like a 2x4. A criticism I've had of PC
> companies for a long time is why didn't a vendor like Intel, Dell, Compaq,
                               ^^^^^^^^^^
> etc. just have the courage to put an Ethernet adapter on the motherboard
> on every one of their PC's.
[...]
The answer is very sipmple, an Ethernet adapter costs money.
If it costs $5 extra per board, on a 100k run they save half a million
dollars, a sum to to be sneezed at....
George
[...]
> --
> Steve Stroh Woodinville, Washington, USA strohs@halcyon.com
>

79. Re: [SS:658] Re: Horz Omnis

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Mon, 09 Dec 1996 15:40:49 -0600
To: ss@tapr.org
Message-ID: <32AC8761.41C6@eds.tinker.af.mil>
Rendered body type: text/plain

Glenn Elmore wrote:
>
> I found the URL to the slot antenna information which Steven Bell, kb7trz presented.
>
> http://192.82.208.21/employees/byee_engr/slot_ant.html
>
> The MathCad program should be there as well.
>
> Glenn n6gn

This looks like the antenna I bought from the San Diego Microwave group.
They had a bunch made up for 10 GHz to be used for beacons. Both the
ARRL and RSGB books show the antenna's to be horizontal polarization and
omnidirectional. I believe the RSGB book shows a flange on the bottom.
I don't know what the effect of it missing has, as the San Diego one
does not have that feature.

The antenna came with a waveguide mount and an end cap, but unassembled,
for about $40 bucks as I recall, with the waveguide mount driving the cost.

That price should scale down nicely with just an SMA or other coaxial connector.

Steve

80. Re: [SS:653] Re: FEC

From: RLANIER@mailb.harris.com (RLANIER)
Date: Mon, 9 Dec 1996 16:30:52 -0500
To: ss@tapr.org
Message-ID: <2ac87ee0@mailb.harris.com>
Rendered body type: text/plain

>>There was the implication that FEC (forward Error
>>Correction) was almost free in SS in previous messages.
>>What type of FEC code would you recommend and why?
>>Would you think a hardware or software FEC
>>is better for SS?
>>Is there a feeling that this is better than
>>just resending a packet?

>Yes, FEC is "free" in a spread spectrum system in the sense that SS always
>performs better with FEC than without it given the same bandwidth and RF
>power. Andrew Viterbi has written an excellent article on this exact point;

>Phil

I still don't understand how SS is "free" in a SS system. FEC still
has to be implemented into the system, either using hardware or
software or both. How is that free?

Do you mean that certain properties of FEC are "built-in" into a SS
system?

Tony

81. Re: [SS:662] Re: FEC

From: clh10@po.cwru.edu (clh10@po.cwru.edu)
Date: Mon, 9 Dec 1996 21:08:18 -0500 (EST)
To: ss@tapr.org
Message-ID: <v01550100aed22d8d7317@[129.22.249.174]>
Rendered body type: text/plain

>   I still don't understand how SS is "free" in a SS system. FEC still
>   has to be implemented into the system, either using hardware or
>   software or both. How is that free?
>
>   Do you mean that certain properties of FEC are "built-in" into a SS
>   system?
>
>   Tony
>
>
Hmmm... Well besides the fact that SS provides a very good signal to
noise ratio in the right conditions, there is extra hardware required
to implement the FEC. However, the answer as whether it is "free" is
perhaps misphrased. Perhaps it would be better to aks what advantages
does SS offer for the implementation of FEC. The following is an
excerpt from CDMA: Principles of Spread Spectrum Communications by Viterbi.

Coding and Interleaving

        By its very nature, direct sequence spread spectrum CDMA provides a
considerably higher dimensionality than needed to transmit information by
any single user. This is reflected by the high processing gain, or
bandwidth-to-data rate, W/R. ..., we demonstrate how this excess
dimensionality or redundancy can be exploited to improve performance,
without compromising the other advantages of the high processing gain.

        In other words, we can add in Convolutional Encoding and Interleaving
without having to accept a lower gain.

Cory L. Hojka   <clh10@po.cwru.edu>
Beta Nu of Theta Chi Fraternity
Case Western Reserve University
Cleveland, OH

82. Re: [SS:655] Wireless Networking built into PC's

From: Ron Cole <rdcole@mindspring.com>
Date: Mon, 09 Dec 1996 20:15:28 -0600
To: ss@tapr.org
Message-ID: <1.5.4.32.19961210021528.0066d7e4@pop.mindspring.com>
Rendered body type: text/plain

At 01:18 AM 12/9/96 -0600, you wrote:
>
>Obligatory SS content: Such a system would almost have to be SS.
>
>That quote hit me between the eyes like a 2x4. A criticism I've had of PC
>companies for a long time is why didn't a vendor like Intel, Dell, Compaq,
>etc. just have the courage to put an Ethernet adapter on the motherboard
>on every one of their PC's. It seems to me that it would be even simpler
>to put a simple wireless tranceiver onboard, and run it almost completely
>in software from the excess processing power on the Pentium/Pro/MMX
>processor (which should, by this point, be labelled "The KA9Q approach").
>
>Steve N8GNJ

If you take a look at Compaq's business line like the Desk Pro and Up they
all come with 10-BaseT NIC built onto the motherboard.   Some of their
latest Laptops have High Speed IRD interfaces built in, and the docking
stations have a 10-BaseT NIC.

I would not be suprised to see either built-in or as an option a 900 Mhz
DSSS NIC from Compaq soon. They seem to be commited to Networking.

Now I just need to stir up some interest in 900 Mhz Amateur Networking here
in the DFW Metroplex.   I know of a couple of users on the band, NBFM ATV,
and a couple of FM Repeaters.

I wonder how a FreeWave DRG-115 would operate on a tower site overlooking
the City ?

Ron Cole
N5HYY
Ron Cole
----------+----------
rdcole@mindspring.com |
N5HYH |
----------+----------

83. Re: [SS:655] Wireless Networking built into PC's

From: clh10@po.cwru.edu (clh10@po.cwru.edu)
Date: Mon, 9 Dec 1996 21:23:30 -0500 (EST)
To: ss@tapr.org
Message-ID: <v01550102aed230ca35fe@[129.22.249.174]>
Rendered body type: text/plain

>Schrock: I'd have to say the technology with the most appeal is something
>that hasn't been talked about too much yet, and that's the in-home
>network. Our strategy is to design into our PCs, by 1998, in-home
>wireless networking. That will let you bring all that media-rich content
>in over the Net, or however, and distribute it throughout the home. It
>will enable the digital home. We won't have a bunch of isolated boxes
>anymore.
>
>Obligatory SS content: Such a system would almost have to be SS.
>
>That quote hit me between the eyes like a 2x4. A criticism I've had of PC
>companies for a long time is why didn't a vendor like Intel, Dell, Compaq,
>etc. just have the courage to put an Ethernet adapter on the motherboard
>on every one of their PC's. It seems to me that it would be even simpler
>to put a simple wireless tranceiver onboard, and run it almost completely
>in software from the excess processing power on the Pentium/Pro/MMX
>processor (which should, by this point, be labelled "The KA9Q approach").
Being a mac user, I will certainly agree that it is nice to have a computer
that came with built-in ethernet. However, the issue that is really being
addressed is a wireless network standard for local computer networks. While
I can't remember off hand where I read about, I know several computer
companies, including Apple, are trying to convince the FCC to open up
a certain part of the bandwdith for such a purpose. I haven't heard much
about it in a while though. I also don't think they were asking for it to
be SS either. For the most part, a single computer in a home would not
necessarily need a SS system for wireless networking. They could just

use something similar to the packet radio that amateurs use today. The point at
which one might want to use SS technology is if there were a lot of computers
trying to communicate, such as an office. But then, one can just wire up
the office for much higher bandwidth at a significantly lower cost than
using SS. (Ethernet reliably gives me a speed of about 70 kilobytes/s,
while the
highest cellular standard that I can think of, off hand, runs at 14.4
kilobits/s max).

Cory L. Hojka <clh10@po.cwru.edu>
Beta Nu of Theta Chi Fraternity
Case Western Reserve University
Cleveland, OH

84. Re: [SS:665] Re: Wireless Networking built into PC's

From: xbrucex <xbrucex@popmail.mcs.net>
Date: Mon, 09 Dec 1996 21:57:18 -0600
To: ss@tapr.org
Message-ID: <199612100359.VAA00445@Kitten.mcs.com>
Rendered body type: text/plain

Guys -
You need to take a look at some of the current SS PCMCIA cards. I'm seeing
many cards that provide 1-2Mbs and some of the new ones are starting to
claim 4Mbs for the next evolution. Most opperate in the 2.4 ISM band, but
there is some noise about going to 5.7Ghz ISM.

Also, the SS computer proposal you are talking about is called NII-Supernet
(European) and Appel et-al were proposing a US version.

GL

Bruce k9bc

At 20:30 12/9/96 -0600, you wrote:
>
>>Schrock: I'd have to say the technology with the most appeal is something
>>that hasn't been talked about too much yet, and that's the in-home
>>network. Our strategy is to design into our PCs, by 1998, in-home
>>wireless networking. That will let you bring all that media-rich content
>>in over the Net, or however, and distribute it throughout the home. It
>>will enable the digital home. We won't have a bunch of isolated boxes
>>anymore.
>>
>>Obligatory SS content: Such a system would almost have to be SS.
>>
>>That quote hit me between the eyes like a 2x4. A criticism I've had of PC
>>companies for a long time is why didn't a vendor like Intel, Dell, Compaq,
>>etc. just have the courage to put an Ethernet adapter on the motherboard
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>>to put a simple wireless tranceiver onboard, and run it almost completely
>>in software from the excess processing power on the Pentium/Pro/MMX
>>processor (which should, by this point, be labelled "The KA9Q approach").
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>that came with built-in ethernet. However, the issue that is really being
>addressed is a wireless network standard for local computer networks. While
>I can't remember off hand where I read about, I know several computer
>companies, including Apple, are trying to convince the FCC to open up
>a certain part of the bandwdith for such a purpose. I haven't heard much
>about it in a while though. I also don't think they were asking for it to
>be SS either. For the most part, a single computer in a home would not
>necessarily need a SS system for wireless networking. They could just
>use something similar to the packet radio that amateurs use today. The point at
>which one might want to use SS technology is if there were a lot of computers
>trying to communicate, such as an office. But then, one can just wire up
>the office for much higher bandwidth at a significantly lower cost than
>using SS. (Ethernet reliably gives me a speed of about 70 kilobytes/s,
>while the
>highest cellular standard that I can think of, off hand, runs at 14.4
>kilobits/s max).
>
>Cory L. Hojka <clh10@po.cwru.edu>
>Beta Nu of Theta Chi Fraternity
>Case Western Reserve University
>Cleveland, OH
>
>
>
>

85. Re: [SS:655] Wireless Networking built into PC's

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Mon, 9 Dec 1996 13:40:53 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vXDRV-000MFdC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

Some spread-spectrum-based home networks already exist, but the one I'm most familiar with runs over power wiring: CEbus, aka TIA IS-60. The data rate is only 10 kbps, so it's not fast enough to be interesting for anything beyond turning lights on and off and perhaps programming your VCR.

For high speed intra-home networking we already have a pretty good technology: 10 base T ethernet. The supplies are cheap, and the installation isn't that bad if you just upgrade your existing phone and CATV wall outlets as I did.

Phil

86. 900MHz AMPs

From: David Dennis <ddennis@metronet.com>
Date: Mon, 9 Dec 1996 23:03:41 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBE625.4D97E800@dal53.metronet.com>
Rendered body type: text/plain

>Bob Morgan, WB5AOH, (on the list) has been looking at building one but I
>was wondering if someone has designs for one or can point to reference that
>discuss constrution and theory.
>
>What are the power restrictions under the STA in the 900-Mhz band? Has
>anyone done anything with homebrewing PAs? How critical is the switching
>time of some of the hybrid devices available? This might be a cheap way out
>instead of the six hundred buck commercial amp I heard about? How good are
>the receivers (sensitivity) on the Beta Test group units?

From my experience of 900MHz ATV there are plenty of "Brick" amps available for 900MHz. These are mostly for cellular apps and trunking radios. I have no idea if they would meet the switching requirements but it would certainly be a lot less than $600.00 for an amp that would put out +43dBm or 20Watts.

87. Re: [SS:662] Re: FEC

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Mon, 9 Dec 1996 22:09:20 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vXLNY-000MDOC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

Tony,

When I said "free", I meant in terms of RF power, bandwidth and performance. Adding FEC to a SS system operating in a given bandwidth will always reduce its RF power requirements over an uncoded SS system in the same bandwidth. You can think of coding as just being a more clever way to spread -- if you're going to spread, you might as well spread cleverly.

I certainly didn't mean to imply that FEC is "free" in the sense that no hardware or software is needed to support it.

Phil

88. Re: [SS:667] Re: Wireless Networking built into PC's

From: "Dan Hoyer" <dhoyer@ccm.frontiercorp.com>
Date: Tue, 10 Dec 96 09:47:55 EST
To: ss@tapr.org
Message-ID: <9611108502.AA850243998@ccm.frontiercorp.com>
Rendered body type: text/plain

Hi all,

As a networking engineer who deals with LANs and WANs all day long, I can tell you that I would much rather have a wireless home network for my PCs than have a wired ethernet. If I have my laptop home from the office, I don't want to plug into the wall to talk to my computers at home. With the wireless you can cut the in-home umbilical cord.

That much said, Phil has a point that right now 10BaseT is cheap to wire a house with. I'm in the process of installing an in-home wiring plant for voice, data, video, IR, and audio. (and it better not interfere with my amateur radio operation, or I'll rip it ALL OUT!!!!!!)

Hopefully the study and enhancement of radio and specifically SS radio technologies will eventually bring around an inexpensive high-speed radio LAN for the home. An added bonus would be to be able to talk to a CEBus system at the same time! <sigh...wireless based home automation...> :-)

Thanks to everyone for all the great information! I just joined this group a couple of days ago, and I'm learning all kinds of stuff!

Dan
KA9VMI

_____ Reply Separator _____
Subject: [SS:667] Re: Wireless Networking built into PC's
Author: ss@tapr.org at INTERNET
Date: 12/10/96 12:26 AM

Some spread-spectrum-based home networks already exist, but the one I'm most familiar with runs over power wiring: CEbus, aka TIA IS-60. The data rate is only 10 kbps, so it's not fast enough to be interesting for anything beyond turning lights on and off and perhaps programming your VCR.

For high speed intra-home networking we already have a pretty good technology: 10 base T ethernet. The supplies are cheap, and the installation isn't that bad if you just upgrade your existing phone and CATV wall outlets as I did.

Phil

89. Re: 900MHz AMPs

From: morganb@inetport.com (Robert B. Morgan)
Date: Tue, 10 Dec 1996 16:54:54 -0600 (CST)
To: ss@tapr.org
Cc: ss-sta@tapr.org
Message-ID: <199612102254.QAA14995@admin.inetport.com>
Rendered body type: text/plain

>
>>Bob Morgan, WB5AOH, (on the list) has been looking at building one but =
>I
>   From my experience of 900MHz ATV there are plenty of "Brick" amps =
>available for 900MHz. These are mostly for cellular apps and trunking =
>radios. I have no idea if they would meet the switching requirements =
>but it would certainly be a lot less than $600.00 for an amp that would =
>put out +43dBm or 20Watts.

I looked in the Newark catalog and a few others, and some Motorola power modules caught my attention. They are:

MHW806A3, MHW812A3, MHW912, MHW914, MHW915, and MHW932.

Newark (cat 113) listed the prices as follows:
-812A3 = $52.92   (class C)
-912   = $71.74   rest were class AB
-914   = $77.42
-915   = $62.92
-932   = $102.77

Down East MWave listed the -806A3 at $5, and the -932 at $100. They also had some devices of other manufacturers that I wasn't familiar with.

Motorola listed a price for only the -812A3, of $41.60 ea, or $35.90 in quantities over 250. The online service said that the other devices weren't priced in the book. I am not sure if that means they aren't on the market, or if they just aren't in the book online.

(see www.Design-NET.com for Motorola datasheets and pricing).

I am still waiting on Motorola Fax to send me the sheet on the -806, but sort of suspect it might be obsolete.

The last two digits indicates the output power capability in Watts,
for instance the MHW932 is a 32 watt device, and is intended for
eurpoean digital GSM service in 20 W radios.

All of the devices had a nominal 12V power supply rating, and had enough
gain to operate off of our 400 mW radios, and in fact most of them
will require attenuation on the input.

Some of the devices are speced to not include all the band we
are using, for instance the MHW-9xx GSM stuff shows 890-915 MHz.
Potential problem if it doesn't have some extra bandwidth.

The Class C amp is pretty much fixed gain. The others are variable
power devices, either by reducing drive, or in the case of the -912
and -914 by means of a DC variable bias from 1 to 3 volts impressed on
the RF input pin. I think we will have to do some research to determine
if we can live with class C, or if we need to run linear. Another
consideration is a need for variable power control.

There are probably quite a few other devices out there that we
could use. These just happened to be handy and stood out when I
looked at the catalogs I have, so I punched up Motorola and got some
datasheets over the internet/faxback service they have.

The above mentioned power modules, for those not familiar with them,
are the active portion of an RF amplifier, with some matching and
some bypassing built into them. They need to be mounted on a heatsink
and one side of them have a row of pins to solder to a PC board which
has some stripline sections to couple RF into and out of the device,
and to supply various control and bias voltages, and any required
switching crcuitry like receiver bypass/preamp. Mainly what I am saying
is that they aren't a complete standalone device ready to insert into
a coax between a radio and an antenna, but are a major component
of such a device. They are attractive because they already have
most of the troublesome RF matching circuitry built in.

73 de Bob WB5AOH
Robert Morgan
Austin Texas
morganb@admin.inetport.com

90. Re: [SS:670] Re: Wireless Networking built into PC's

From: Phil Karn <karn@laptop.ka9q.ampr.org>
Date: Tue, 10 Dec 1996 13:51:58 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vXa5m-000MDyC@laptop.ka9q.ampr.org>
Rendered body type: text/plain

Well, yes. I too would like to be able to lie on the couch in front of
the TV with my laptop on my lap and not have a cable running to the
wall. Though a wireless modem doesn't solve the problem of bringing
power to my laptop to keep the battery from going flat, and if you
have one cord going to the wall you might as well have two...

Cost is likely to be a major factor. Even if the wireless stuff is
fast enough to be useful as a true LAN (which immediately excludes
much, though not all of the existing Part 15 market), it is unlikely
to be as cheap as 10Base-T equipment. Even PCMCIA cards, which are
historically all overpriced, are down to about $110 for an Ethernet
card at the local computer superstore. I think it'll be a while before
fast wireless PCMCIA network cards are down to this level.

Phil

91. Re: [SS:672] Re: Wireless Networking built into PC's

From: clh10@po.cwru.edu (clh10@po.cwru.edu)
Date: Tue, 10 Dec 1996 21:07:38 -0500 (EST)
To: ss@tapr.org
Message-ID: <v01550100aed3809bf46c@[129.22.249.174]>
Rendered body type: text/plain

This will probably be my last post on this subject, since it is starting
to stray out of the area of SS, but another type of networking that is
commercial available is Infrared. Several printers, laptops, PDA's, and
calculators use it already. It does have its limitations, but the cost of
putting into a product is cheap, making it an easy way to provide networking
without significantly adding to the price of the product.

Cory L. Hojka   <clh10@po.cwru.edu>

Beta Nu of Theta Chi Fraternity
Case Western Reserve University
Cleveland, OH

92. RE: 671] Re: 900MHz AMPs

From: David Dennis <ddennis@metronet.com>
Date: Tue, 10 Dec 1996 22:15:44 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBE6E7.EBAF7900@dal169.metronet.com>
Rendered body type: text/plain

From: Robert B. Morgan[SMTP:morganb@inetport.com]
Sent: Tue, December 10, 1996 10:55 AM
To: ss@tapr.org
Subject: [SS:671] Re: 900MHz AMPs

I looked in the Newark catalog and a few others, and some Motorola
power modules caught my attention. They are:

MHW806A3, MHW812A3, MHW912, MHW914, MHW915, and MHW932.

Newark (cat 113) listed the prices as follows:
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in quantities over 250. The online service said that the other devices
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Potential problem if it doesn't have some extra bandwidth.

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power devices, either by reducing drive, or in the case of the -912
and -914 by means of a DC variable bias from 1 to 3 volts impressed on
the RF input pin. I think we will have to do some research to determine
if we can live with class C, or if we need to run linear. Another
consideration is a need for variable power control.

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looked at the catalogs I have, so I punched up Motorola and got some
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and one side of them have a row of pins to solder to a PC board which
has some stripline sections to couple RF into and out of the device,
and to supply various control and bias voltages, and any required
switching crcuitry like receiver bypass/preamp. Mainly what I am saying
is that they aren't a complete standalone device ready to insert into
a coax between a radio and an antenna, but are a major component
of such a device. They are attractive because they already have
most of the troublesome RF matching circuitry built in.

73 de Bob WB5AOH
Robert Morgan
Austin Texas
morganb@admin.inetport.com

I've used some of these devices on ATV, right at 915MHz. (The top end of the spec.) I've looked around here but I can't find my old Xmitter but I think I was last using the -806A. This worked well. If someone can design the stripline I can turn a drawing into artwork for a board.

Do we have an answer to the question, will these switch fast enough?

73's Dave D. N5BOC

93. unsubscribe

From: Paer Ant <t93ant@student.tdb.uu.se>
Date: Thu, 12 Dec 1996 18:00:39 +0100 (MET)
To: ss@tapr.org
Message-ID: <199612121700.SAA05655@vindemiatrix.tdb.uu.se>
Rendered body type: text/plain

[Empty message body]

94. Re: Interest in a Senior Project

From: c1f@juno.com
Date: Thu, 12 Dec 1996 15:16:27 PST
To: ss@tapr.org
Message-ID: <19961212.162354.6878.10.C1F@juno.com>
Rendered body type: text/plain

Hello Bernie

6M FHSS sounds interesting , any ready made units available, or kits or is it all from scratch....

Stan, WA1ECF   Cape Cod...

95. Re: Horz Omnis

From: c1f@juno.com
Date: Thu, 12 Dec 1996 15:36:12 PST
To: ss@tapr.org
Message-ID: <19961212.162354.6878.12.C1F@juno.com>
Rendered body type: text/plain

Hello Don

I am interested in a 900 Mhz antenna for a horizontally polarized
omnidirectional beacon, Can you send me information on yours...

Stan, WA1ECF

96. aim antennas...

From: Kleber Almeida <kleber@magiclink.com.br>
Date: Thu, 12 Dec 1996 20:47:35 -0200
To: ss@tapr.org
Message-ID: <32B08B87.7F66@magiclink.com.br>
Rendered body type: text/plain

Where i abtain iformation (sites) about equipment and method for aim
 antennas in ISM band and SHF mainly in metropolitan area with many
edifications ?

97. unsubscribe

From: "Miguel Angel Portillo" <pcport@redestb.es>
Date: Wed, 13 Dec 1995 01:02:11 +0100
To: ss@tapr.org
Message-ID: <30CE1803.3FF1@redestb.es>
Rendered body type: text/plain

[Empty message body]

98. This will make you smile

From: morganb@inetport.com (Robert B. Morgan)
Date: Fri, 13 Dec 1996 03:24:54 -0600 (CST)
To: ss-sta@tapr.org
Cc: ss@tapr.org
Message-ID: <199612130924.DAA09353@admin.inetport.com>

Rendered body type: text/plain

Today (or yesterday evening if you prefer) Dec 12 1996, from about 2030
to about 0230 the next morning, I surfed the web at high speed over
the ham radio. (I am sending this to both SS reflectors, this is for
operations under the STA).

Greg set his system up on his ISDN line, and had his freewave radio
on the other end (of course), and after a little bit of server
configuration, and a tweak or two on this end, I was surfing the
web, at speeds I wasn't accustomed to on my 14.4 kb landline modem.

One of the first things I happen to find on TAPR's server was the
text of Lyle Johnson's speech at the recent DCC, and scanning through
it, one paragraph in particular jumped out at me. Lyle was referring
to the SS beta test, and thought something ought to take place in
early 1997. That is apparently on track, with the radio order looking
like that will be the delivery date (from what I hear anyhow), but
here it is the middle of Dec 96, and I am up and running. And Lyle said
something about why we have Pentiums and hotshot landline modems, but
still run 1200b packet on the air (well I run 9600 most of the time
myself but that's another story). Well I smashed that barrier all
to smithereens today at high speed, and it was fun. And VERY satisfying.

Greg said to turn the usual landline SLIP/PPP compression off before
going on the air, apparently he isn't set up for that as yet. So I
am running 38400b to a radio modem with an on-the-air modem speed of
some 173Kb, to a server/router on an ISDN line with only him and me
for users, and I am seeing average file transfer rates as displayed
by Netscape of from 1800 to over 2400 bytes/sec (not bits/sec mind you).
When I am on my 14400b landline modem, I guess running compressed,
to my ISP down the road, I almost never see anything over 1300 bytes/sec
average rate, and of course some of the slow sites back down to half that.

Then I would stop and think about what I was doing here for the first
time. Look at the ll modem, it is off line. The file transfers are
humming right along. For the first time, I can talk on the telephone
while I am surfing the net. Never could do that before. Then I look
over my shoulder at the serial cable running over to the SS radio, and
the other end of that is a cable that goes to the antenna, and then it
just disappears into space. At least for a block away to Greg's place,
where his unit is doing the same. I look down at the oscilloscope that
I have connected to the feedline wattmeter, and during the thick of
the file transfer, there are some intermittent TX pulses about every
20 or so milliseconds (I am only seeing my acks, I wonder what Greg's
radio dutycycle is). There is still a lot of empty time on that channel,
at least what I can judge from this end. I guess this qualifies as
real QRP operation too, just 400 mW, and a low duty cycle at that.
This little unit might make a dandy unit on a solar powered remote site
too.

After I got tired of playing with TAPR's site, I turned to chasing
some things on the web. I actually had a useful and productive session.
I had been looking for some solar flare data, and I found it for
the first time and downloaded about a megabyte of that, and all together,
I probably pulled down somewhere I would estimate around 3 to 4 megabytes
of all sorts of stuff, and may have set some sort of a personal ftp
transfer record. As far as I could tell, things were working without
a hitch, very smooth, no surprises.

That 1200b radio barrier we have let hang around all too long is just
about to get swept away I think. While it has its uses, this has
a lot of potential. And it is for real, right now today.

As far as the antenna project is concerned, I didn't get too terribly
much more done on it today, but it is tuned reasonably close as far as
the feedpoint is concerned, and around 1.5:1 SWR. But now that little
6 element beam has transferred several megabytes of data.

73 de Bob WB5AOH
Robert Morgan
Austin Texas
morganb@admin.inetport.com

99. hello

From: Allen Finne <dallen@cei.net>
Date: Fri, 13 Dec 1996 09:14:38 -0600
To: ss@tapr.org

Message-ID: <1.5.4.32.19961213151438.0069f164@cei.net>
Rendered body type: text/plain

I have just joined the the list and wanted to say a quick hello to
everyone on the list.

Allen

-kb5sqk-

100. Re: [SS:680] This will make you smile

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Fri, 13 Dec 1996 11:06:55 -0500
To: ss@tapr.org
Message-ID: <199612131606.LAA03591@Paris.GASD102designcenter>
Rendered body type: text/plain

> From ss@tapr.org Fri Dec 13 05:41:24 1996
> Date: Fri, 13 Dec 1996 03:24:44 -0600 (CST)
> Originator: ss@tapr.org
> From: morganb@inetport.com (Robert B. Morgan)
> To: ss@tapr.org
> Subject: [SS:680] This will make you smile
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: Tucson Amateur Packet Radio Spread Spectrum
>
> Today (or yesterday evening if you prefer) Dec 12 1996, from about 2030
> to about 0230 the next morning, I surfed the web at high speed over
> the ham radio. (I am sending this to both SS reflectors, this is for
> operations under the STA).
>
> Greg set his system up on his ISDN line, and had his freewave radio
> on the other end (of course), and after a little bit of server
> configuration, and a tweak or two on this end, I was surfing the
> web, at speeds I wasn't accustomed to on my 14.4 kb landline modem.
>
> Greg said to turn the usual landline SLIP/PPP compression off before
> going on the air, apparently he isn't set up for that as yet. So I
> am running 38400b to a radio modem with an on-the-air modem speed of
> some 173Kb, to a server/router on an ISDN line with only him and me
> for users, and I am seeing average file transfer rates as displayed
> by Netscape of from 1800 to over 2400 bytes/sec (not bits/sec mind you).
> When I am on my 14400b landline modem, I guess running compressed,
> to my ISP down the road, I almost never see anything over 1300 bytes/sec
> average rate, and of course some of the slow sites back down to half that.

It seems to me, Bob, that you and Greg have found a way to entice Generation-X
to amateur radio. It is a very frustrating situation to surf the net at 28800
at home, but have a direct ISDN connection at work. Maybe your method will jump
over the speed hurdle that exists until landline modems (and phone lines)
increase in speed. This is a good area where we amateurs can push the envelope
in new technologies.

> I look down at the oscilloscope that
> I have connected to the feedline wattmeter, and during the thick of
> the file transfer, there are some intermittent TX pulses about every
> 20 or so milliseconds (I am only seeing my acks, I wonder what Greg's
> radio dutycycle is). There is still a lot of empty time on that channel,
> at least what I can judge from this end. I guess this qualifies as
> real QRP operation too, just 400 mW, and a low duty cycle at that.
> This little unit might make a dandy unit on a solar powered remote site
> too.

I would be curious if any QRPers were having a "chat" nearby when you were on
the air. This would make a good test bed: download files from the net while at
the same time have a QRP session with Greg and see if you get any interference.

>
> That 1200b radio barrier we have let hang around all too long is just
> about to get swept away I think. While it has its uses, this has
> a lot of potential. And it is for real, right now today.

It would be nice if we could develop a high-speed modem (> 1meg/sec) and
implement that in the next amateur satellite (Phase 4 ??), running SS of course.

>
> 73 de Bob WB5AOH
> Robert Morgan
> Austin Texas

> morganb@admin.inetport.com

73s de Tony KE4ATO
tony@spacey.net

101. Re: [SS:681] hello

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Fri, 13 Dec 1996 14:03:25 -0500
To: ss@tapr.org
Message-ID: <199612131903.OAA03698@Paris.GASD102designcenter>
Rendered body type: text/plain

> I have just joined the the list and wanted to say a quick hello to
> everyone on the list.
>
> Allen
>
> -kb5sqk-
>

Hello Allen

102. unsubscribble

From: ve6bsf@valis.worldgate.com
Date: Fri, 13 Dec 1996 16:03:49 +0000
To: ss@tapr.org
Cc: hfsig@tapr.org
Message-ID: <199612132302.QAA20977@valis.worldgate.com>
Rendered body type: text/plain

[Empty message body]

103. unsubscribe

From: Miguel Angel Garcia Estrello <migarcia@csiam1.mxl.uabc.mx>
Date: Fri, 13 Dec 1996 16:47:48 -0800
To: ss@tapr.org
Message-ID: <32B1F934.2C5C@csiam1.mxl.uabc.mx>
Rendered body type: text/plain

[Empty message body]

104. SS Audio transmissions in Antarctica

From: RICHARDS@dilbert.lbl.gov
Date: Fri, 13 Dec 1996 19:38:27 -0800 (PST)
To: ss@tapr.org
Message-ID: <961213193827.19b@dilbert.lbl.gov>
Rendered body type: text/plain

I am a physicist at UC Berkeley, and I work on an experiment at the
South Pole. We are building a giant neutrino detector using the ice as a
target for high-energy neutrinos from space. We need to understand as much
as possible about the ice sheet (which is 2.8 km thick at the pole) in order
to design the best detector at the best depth. I wish to monitor ice movement
using a capacitive microphone placed in a pressure housing at 2 km depth.
I would like to relay the acoustic signals to the surface via a SS radio link
built on a 50-200 MHz radio platform. Antarctica is not under FCC juristic-
tion, so we can operate at frequencies not available to Amateur radio people
in the states. I wish to know the following:

1) Will the SS receiver ASICs currently available work in the 50-200 MHz band?
2) Should one convert audio into 8 bit digital data (for example) then
mix this data stream with a PRBS at some chipping frequency (say 10 MHz) to
acheive a SS signal?

The ice is actually quite transparent to radio waves at these frequencies. I wish to use SS to
avoid the problem of interference from equipment that
operates at pole 4 months out of the year, and also to prevent the generation
of RFI which would compromise the performance of the neutrino detector.

I understand that these are basic questions that may not be of general
interest. Perhaps any interested and knowledgable people could contact me
directly?

Best, Austin

Dr. Austin Richards

Dept. of Physics
UC Berkeley

richards@dilbert.lbl.gov

105. Re: [SS:681] hello

From: c1f@juno.com
Date: Fri, 13 Dec 1996 18:23:55 PST
To: ss@tapr.org
Message-ID: <19961214.080545.10182.0.C1F@juno.com>
Rendered body type: text/plain

Hello Allen, Welcome to the reflector....

Stan, WA1ECF

106. Re: [SS:686] SS Audio transmissions in Antarctica

From: Bob Stricklin <bstrick@dallas.net>
Date: Sat, 14 Dec 1996 08:55:55 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19961214145555.002f7ad8@plano.net>
Rendered body type: text/plain

A few questions?

1. How do you plan to power the telemetry package? Batteries?
2. What is the expected operating temperature down 2 km and on the surface
when you go to install the package?
3. Do you have any data on the expected attenuation of rf from 50-200 MHz
when passing through ice? This data would be helpful in calculating the
power requirements.
4. Do you plan on transmitting from the bottom only?

My experience tells me this group will enjoy hearing about a real
application and a scientific experiment.

At 09:38 PM 12/13/96 -0600, you wrote:
>
>   I am a physicist at UC Berkeley, and I work on an experiment at the
>South Pole. We are building a giant neutrino detector using the ice as a
>target for high-energy neutrinos from space. We need to understand as much
>as possible about the ice sheet (which is 2.8 km thick at the pole) in order
>to design the best detector at the best depth. I wish to monitor ice movement
>using a capacitive microphone placed in a pressure housing at 2 km depth.
>I would like to relay the acoustic signals to the surface via a SS radio link
>built on a 50-200 MHz radio platform. Antarctica is not under FCC juristic-
>tion, so we can operate at frequencies not available to Amateur radio people
>in the states. I wish to know the following:
>
>1) Will the SS receiver ASICs currently available work in the 50-200 MHz band?
>2) Should one convert audio into 8 bit digital data (for example) then
>mix this data stream with a PRBS at some chipping frequency (say 10 MHz) to
>acheive a SS signal?
>
>
>   The ice is actually quite transparent to radio waves at these frequencies.
I wish to use SS to avoid the problem of interference from equipment that
>operates at pole 4 months out of the year, and also to prevent the generation
>of RFI which would compromise the performance of the neutrino detector.
>
>   I understand that these are basic questions that may not be of general
>interest. Perhaps any interested and knowledgable people could contact me
>directly?
>
>   Best, Austin
>
>   Dr. Austin Richards
>   Dept. of Physics
>   UC Berkeley
>
>   richards@dilbert.lbl.gov
>
>

Bob Stricklin, N5BRG
bstrick@dallas.net AKA: bstrick@plano.net   bstrick@tenet.edu
Dallas, Texas

107. Re: [SS:686] SS Audio transmissions in Antarctica

From: Bob Stricklin <bstrick@dallas.net>
Date: Sat, 14 Dec 1996 10:59:50 -0600
To: ss@tapr.org
Message-ID: <2.2.32.19961214165950.002fe84c@plano.net>
Rendered body type: text/plain

At 09:38 PM 12/13/96 -0600, you wrote:

>1) Will the SS receiver ASICs currently available work in the 50-200 MHz band?

Most of the chip sets on the market today are being used at 900 MHz or 2.4 GHz. However it would be possible to build a transverter to operate in the range of 50-200 MHz.

>2) Should one convert audio into 8 bit digital data (for example) then
>mix this data stream with a PRBS at some chipping frequency (say 10 MHz) to
>acheive a SS signal?

This would work. Will 8 bits give you enough resolution? You can probably use more than 8 bits without adding much complexity. If you are only going to monitor audio levels you may be able to build a simple system using an off the shelf digital phone with a directional antenna (if you can be sure of its pointing direction when installed) and a small amplifier. I really think a key will be operating power needed to support the package and operating temperature.

Bob Stricklin, N5BRG
bstrick@dallas.net AKA: bstrick@plano.net   bstrick@tenet.edu
Dallas, Texas

108. Re: [SS:664] Re: Wireless Networking built into PC's

From: "Alan K. Wilson, M.D." <ka5wgl@airmail.net>
Date: Sat, 14 Dec 1996 23:18:23 -0600
To: <ss@tapr.org>
Message-ID: <m0vZ94p-000Fz3E@mail.airmail.net>
Rendered body type: text/plain

Hi, Ron. Where is all the activity in the Metroplex area. I live in Corsicana and am interested in getting started in interconnecting packet to the Internet. I know that some people have already started, so I guess that I just need a contact person.
Thanks and 73
Alan, KA5WGL

> From: Ron Cole <rdcole@mindspring.com>
> To: ss@tapr.org
> Subject: [SS:664] Re: Wireless Networking built into PC's
> Date: Monday, December 09, 1996 8:20 PM
>
> At 01:18 AM 12/9/96 -0600, you wrote:
> >
> >Obligatory SS content: Such a system would almost have to be SS.
> >
> >That quote hit me between the eyes like a 2x4. A criticism I've had of PC
> >companies for a long time is why didn't a vendor like Intel, Dell, Compaq,
> >etc. just have the courage to put an Ethernet adapter on the motherboard
> >on every one of their PC's. It seems to me that it would be even simpler
> >to put a simple wireless tranceiver onboard, and run it almost completely
> >in software from the excess processing power on the Pentium/Pro/MMX
> >processor (which should, by this point, be labelled "The KA9Q approach").
> >
> >Steve N8GNJ
>
> If you take a look at Compaq's business line like the Desk Pro and Up they
> all come with 10-BaseT NIC built onto the motherboard.   Some of their
> latest Laptops have High Speed IRD interfaces built in, and the docking
> stations have a 10-BaseT NIC.
>

> I would not be suprised to see either built-in or as an option a 900 Mhz
> DSSS NIC from Compaq soon. They seem to be commited to Networking.
>
> Now I just need to stir up some interest in 900 Mhz Amateur Networking
here
> in the DFW Metroplex.   I know of a couple of users on the band, NBFM
ATV,
> and a couple of FM Repeaters.
>
> I wonder how a FreeWave DRG-115 would operate on a tower site overlooking
> the City ?
>
> Ron Cole
> N5HYY
> Ron Cole
>
---------------------------------------+-----------------------------------

> -------
> rdcole@mindspring.com |
> N5HYH |
>
---------------------------------------+-----------------------------------

> -------
>

109. Re: [SS:688] Re: SS Audio transmissions in Antarctica

From: rlanier@su102s.ess.harris.com (Tony Lanier)
Date: Mon, 16 Dec 1996 08:55:25 -0500
To: ss@tapr.org
Message-ID: <199612161355.IAA07630@Paris.GASD102designcenter>
Rendered body type: text/plain

>
> My experience tells me this group will enjoy hearing about a real
> application and a scientific experiment.
>
>
> At 09:38 PM 12/13/96 -0600, you wrote:
> >
> >   I am a physicist at UC Berkeley, and I work on an experiment at the
> >South Pole. We are building a giant neutrino detector using the ice as a
> >target for high-energy neutrinos from space. We need to understand as much
> >as possible about the ice sheet (which is 2.8 km thick at the pole) in order
> >to design the best detector at the best depth. I wish to monitor ice movement
> >using a capacitive microphone placed in a pressure housing at 2 km depth.
> >I would like to relay the acoustic signals to the surface via a SS radio link
> >built on a 50-200 MHz radio platform. Antarctica is not under FCC juristic-
> >tion, so we can operate at frequencies not available to Amateur radio people

You are correct that there are people on this reflector that would be very
interested to know about this experiment. Finding other uses for SS other than
Amateur Radio is refreshing.

73 de Tony KE4ATO

110. Motorola Mitrek?

From: Guillermo Castillo Nunez <memo@kim.fcfm.buap.mx>
Date: Tue, 17 Dec 1996 04:31:35 -0600
To: ss@tapr.org
Message-ID: <199612171031.EAA15201@kim.fcfm.buap.mx>
Rendered body type: text/plain

Hello all.
Once I heard from some that old Motorola Mitrek tranceiver, can be get in
south california. I would like to know if some knows whewre to ask for them
or buy them. or someboby can to sell me ?, I need two or tree working !
Please let me know.

Sincerely   Memo.

xe1ff@amsat.org
or
memo@kim.fcfm.buap.mx

111. Re: [SS:692] Motorola Mitrek?

From: doug cole <dcole@on-ramp.ior.com>
Date: Tue, 17 Dec 1996 18:39:14 -0800
To: ss@tapr.org
Message-ID: <32B75952.5D91@on-ramp.ior.com>
Rendered body type: text/plain

Hello Guillermo :
I have purchased uhf mitreks from a company in billings montana called
CW-Wolfe Communications, their address is 1113 central ave. billings
montana, usa 59102. Phone # is 1-406-252-9617.
Ask for Bud Wolfe as he is the owner and an amateur radio operator and
tell him you are a ham and ask if he has any more uhf mitreks and tell
him that they are for amateur use and he should give you a better price
than commercial buyers :)

good luck
73's
doug cole
de N7BFS

ps: if you need help modifying these for full duplex let me know as I
have done many of them and am most familiar with them...

112. linux wavelan drivers

From: Clearbrook Technical <clearbrook_technical@linux.clrtech.com>
Date: Tue, 17 Dec 1996 21:44:50 -0800
To: ss@tapr.org
Message-ID: <199612180544.VAA00511@linux.clrtech.com.>
Rendered body type: text/plain

Hi, i picked up some of the WaveLan boards on the original buy, and have a
link running over about a 10km distance, using linux boxes as routers at
both ends, performance has been very good, moving zipped files using the
WS_FTP client it shows a consistent 1.4MBits xfer rate!

Question: someone a while back mentioned a linux driver that was available
or being worked on, that had hooks for monitoring the RF on these cards,
does anyone have any info on these drivers...? It would be nice to be able
to see what the links are doing in real time.....
cheers
fred kehler (ve7ipb)
clearbrook technical services ltd 604 850 3010

113. unsubscribe

From: "Eric M. de Castro" <emcastro@pobox.com>
Date: Wed, 18 Dec 1996 09:51:14 -0300
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBED1E.4AE0F840@TBASP01>
Rendered body type: text/plain

[Empty message body]

114. LAN Implimentations / Antenna Options...

From: wb9mjn@wb9mjn.ampr.org
Date: Wed, 18 Dec 96 09:07:15 UTC
To: ss@tapr.org
Message-ID: <11700@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi,

  There is an oportunity to move the LAN architecture ideas forward with the
915 Radios, and various antenna types.

  Comments have been made that Omni antenna at central hub is a way to do this.
This follows the traditional 145.01 Ham Radio technigue.

  Commercial wireless systems commonly use sectorized hub technigues. This
greatly increases capacity, within the wireless range (area) of the hub.

  Hams are going to want to do CUSEEME, amoung other things. One CUSEEME op-
eration in a Omni hub'd system, maxes that capacity.

  With a sectorized hub, the other spokes of the hub still have capacity. Or,
in other words, we have as many CUSEEME QSO s possible, as the number of spokes.

  I m not sure of the channel access technigue used by the Freewave Radios,
can anybody enlighten me? If its CSMA, this would be another reason to
sectorise a hub. Within each sector, of a high hub, the users will have a

much greater chance to hear each other. Versus, trying to hear users on the other side of the hill.

Microstrip patch antennas typically have F/B ratios in excess of 20 dB. When placed on buildings, antenna seperations of 10 meters are possible. This represents a 60 dB isolation. At 30 dBm power level, the RF from one radio, colocated at a site would be at -30 dBm out of the antenna on the other side of the building. This is a practical possibility. We could run two , or more radios at a single high site, without desense, on seperate hopping codes.

There are also multipath advantages. Reflections off other structures on the building, are made negligable, while the antenna provides a wide beam width of coverage.

I ve been told that the hopping rate of the Freewave radios is 10 ms. 10 ms represents a propagation distance of 1800 miles. Multipath protection, from reflections in excess of 1800 miles additional path distance would then be available from these radios. Needless to say, in a terrestrial enviorment, this is akin to no multipath protection at all from this FHSS.

The WWW.BALTZER.NL/WIRELESSCD Web page points out measurements, that predict, that indoor antennas, even with sufficient signal level, will not work at the data rates of the Freewave radio, when talking to a site a distance away, outside the building. 20 us delay spreads were measured for this situation. This puts the point of dimishing performance at a data rate of 10 kb/s (1/5 of 1/20us). The Freewave radio use a raw data rate of 173 KB/s i believe. Outdoor antennas in an suburban/urban enviorment are reported to have measured delay spreads of 2 us, worse case. This makes the point of diminishing performance 100 KB. 173 KB would probably work in most circumstances, but every now and then, it wont, based on this information.

A Microstrip patch antenna, operated in a window will have similar performance to an outdoor antenna. Without the reliability problems outdoor antennas represent. A microstrip patch antenna would be an ideal user antenna for a 915 Freewave radio LAN.

I ve made a prototype Microstrip Patch antenna for 915. The dimensions are 12 by 9 by 2 inches thick. It has 6 dBd gain, but when oriented for horizontal polarisation, the antennas may be butted together along the 12 inch side, and stacked for additional gain. Indoors, this may be done with double faced foam tape! 2 patches would have aproximately 9 dBd gain. 4 patches, 12 dBd gain. And so on. One may obtain one antenna, and if they need more gain, add antennas afterward.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

115. Article I saw...

From: "Fred M. Spinner" <fred@tekdata.com>
Date: Wed, 18 Dec 1996 11:36:52 -0600 (CST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.91.961218113057.4171A-100000@tekdata.com>
Rendered body type: text/plain

I'm here at work stealing some time from the ol' corporate empire.. I noticed in one of the free mags I got there is a "Buyer's Guide" for wireless LANS.. page 120 12/15/96. They have a web page at www.networkcomputing.com. Since most of the units listed are SS at 902-928 or 2.4 GHz I thought this might be of interest to the group.

Fred M. Spinner, KA9VAW

116. [SS:695] unsubscribe

From: kd4kao@juno.com (Harley w Patrick)
Date: Wed, 18 Dec 1996 14:06:39 EST
To: ss@tapr.org
Message-ID: <19961218.151336.4783.0.KD4KAO@juno.com>
Rendered body type: text/plain

Please take me off this mailing list.

117. Re: [SS:698] unsubscribe

From: Steve Sampson <ssampson@claven.tinker.af.mil>
Date: Wed, 18 Dec 1996 14:21:16 -0600
To: ss@tapr.org

Message-ID: <32B8523C.1CFB@eds.tinker.af.mil>
Rendered body type: text/plain

Harley w Patrick wrote:
>
> Please take me off this mailing list.

You can do that yourself. In case you forgot, go to:

http://www.tapr.org

and follow the SIG tree till you get to unsubscribe.

Merry Christmas,

Steve

118. Re: [SS:694] linux wavelan drivers

From: David G Taylor <taylord@ecn.purdue.edu>
Date: Wed, 18 Dec 1996 16:36:21 -0500 (EST)
To: ss@tapr.org
Message-ID: <v03007804aeddcd96feba@[128.46.169.162]>
Rendered body type: text/plain

>Hi, i picked up some of the WaveLan boards on the original buy, and have a
>link running over about a 10km distance, using linux boxes as routers at
>both ends, performance has been very good, moving zipped files using the
>WS_FTP client it shows a consistent 1.4MBits xfer rate!
>
>Question: someone a while back mentioned a linux driver that was available
>or being worked on, that had hooks for monitoring the RF on these cards,
>does anyone have any info on these drivers...? It would be nice to be able
>to see what the links are doing in real time.....
>cheers
>fred kehler (ve7ipb)
>clearbrook technical services ltd 604 850 3010

Would you share the details of the RF amplifier and antennas you are using ?
I have 4 bds from the buy which I've been using intrabuilding. I now want
to set up a 6 mile link, and a 1 mile link, both going into a hub. The
distant ends are in
line with each other, so a directional antenna at the hub may work.
Suggestions appreciated !

73 David de KB9KNS

(Am cordless; will travel.)   --taylord@ecn.purdue.edu

119. Re: unsubscribe

From: kd4kao@juno.com (Harley w Patrick)
Date: Wed, 18 Dec 1996 17:38:47 EST
To: ss@tapr.org
Message-ID: <19961218.184613.4783.3.KD4KAO@juno.com>
Rendered body type: text/plain

I never added myself to this list and do not have internet access. So if
the sysop of this mailing will PLEASE remove me, I would appreciate it.

Patrick

On Wed, 18 Dec 1996 14:29:49 -0600 (CST) Steve Sampson
<ssampson@claven.tinker.af.mil> writes:
>Harley w Patrick wrote:
>>
>> Please take me off this mailing list.
>
>You can do that yourself. In case you forgot, go to:
>
>http://www.tapr.org
>
>and follow the SIG tree till you get to unsubscribe.
>
>Merry Christmas,
>
>Steve
>
>

120. Re: [SS:700] Re: linux wavelan drivers

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Wed, 18 Dec 1996 17:53:38 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.961218175024.3197B-100000@uhf.wdc.net>
Rendered body type: text/plain

Hi Fred/David:

Didn't catch the start of this thread....

> >Hi, i picked up some of the WaveLan boards on the original buy, and have a
> >link running over about a 10km distance, using linux boxes as routers at
> >both ends, performance has been very good, moving zipped files using the
> >WS_FTP client it shows a consistent 1.4MBits xfer rate!

Nice!

> >Question: someone a while back mentioned a linux driver that was available
> >or being worked on, that had hooks for monitoring the RF on these cards,
> >does anyone have any info on these drivers...? It would be nice to be able
> >to see what the links are doing in real time.....
> >cheers
> >fred kehler (ve7ipb)
> >clearbrook technical services ltd 604 850 3010

The only thing I know about is waveinfo. And I thought waveinfo only works
on the PCMCIA Wavelan cards (which I use at home).

> Would you share the details of the RF amplifier and antennas you are using ?
> I have 4 bds from the buy which I've been using intrabuilding. I now want
> to set up a 6 mile link, and a 1 mile link, both going into a hub. The
> distant ends are in
> line with each other, so a directional antenna at the hub may work.
> Suggestions appreciated !

Yes. I'd love hear about this too!

73 Bernie nu1s

121. Re: [SS:700] Re: linux wavelan drivers

From: Fred Kehler <clearbrook_technical@mindlink.bc.ca>
Date: Wed, 18 Dec 1996 16:14:28 -0800
To: ss@tapr.org
Message-ID: <199612190014.QAA00888@linux.clrtech.com.>
Rendered body type: text/plain

>To: ss@tapr.org
>From: Fred Kehler <clearbrook_technical@mindlink.net>
>Subject: Re: [SS:700] Re: linux wavelan drivers
>
>Sure, I'm using nothing :-), at least in the way of amplifiers. I have a
10km line of sight path with the antennas up about 15ft at the ends and a
valley floor in between, so should be minimal fresnel losses, on each end i
am using an 11 element loop yagi that i ordered from Down East Microwave,
with a gain spec of 12.5dbi. feedline is about 30ft- 1/2" heliax at my home
end. The other end is at my place of work and i had a long run from the
antenna made up of 20ft RG8 and about 30ft of RG58 going directly to the
WaveLan cards, I hacked the patch antenna cables off and made adapter cables
to go to BNC ends, as i had trouble finding suitable patch cables to go from
the cards to my bigger connectors.....
>anyway the link has survived the most snow we have had here (Pacific
Northwest), even with snow on the antennas it keeps chugging along, i tried
inserting another 50ft of RG58 as an attenuator, this seemed to bring the
path budget right to the edge as performance dropped right off. I tried
doing a link running with an inverter and a yagi strapped to the back of my
truck, (about a 5ft piece of wood) i had no trouble establishing contact at
13km and also 19km -all line of sight, i didn't do any actual test of
thruput but the connection 'felt' solid. I was surprised with the results i
got and intend to follow up with a more experiments when the weather
improves :-)
>right now i am using the link to surf the net from my home to place of work
>
>If you have line of sight i would be tempted to try the link with just a
couple of good antennas before investing in RF amps...
>good luck
>
>>

>>Would you share the details of the RF amplifier and antennas you are using ?
>>I have 4 bds from the buy which I've been using intrabuilding. I now want
>>to set up a 6 mile link, and a 1 mile link, both going into a hub. The
>>distant ends are in
>>line with each other, so a directional antenna at the hub may work.
>>Suggestions appreciated !
>>
>>73 David de KB9KNS
>>
>>
>>(Am cordless; will travel.)   --taylord@ecn.purdue.edu
>>
>>
>>
>>
>>
>
cheers
Fred Kehler
Clearbrook Technical Services Ltd
voice 604 850-3010

122. Re: [SS:700] Re: linux wavelan drivers

From: Fred Kehler <clearbrook_technical@mindlink.net>
Date: Wed, 18 Dec 1996 16:14:27 -0800
To: ss@tapr.org
Message-ID: <199612190014.QAA00886@linux.clrtech.com.>
Rendered body type: text/plain

Sure, I'm using nothing :-), at least in the way of amplifiers. I have a
10km line of sight path with the antennas up about 15ft at the ends and a
valley floor in between, so should be minimal fresnel losses, on each end i
am using an 11 element loop yagi that i ordered from Down East Microwave,
with a gain spec of 12.5dbi. feedline is about 30ft- 1/2" heliax at my home
end. The other end is at my place of work and i had a long run from the
antenna made up of 20ft RG8 and about 30ft of RG58 going directly to the
WaveLan cards, I hacked the patch antenna cables off and made adapter cables
to go to BNC ends, as i had trouble finding suitable patch cables to go from
the cards to my bigger connectors.....
anyway the link has survived the most snow we have had here (Pacific
Northwest), even with snow on the antennas it keeps chugging along, i tried
inserting another 50ft of RG58 as an attenuator, this seemed to bring the
path budget right to the edge as performance dropped right off. I tried
doing a link running with an inverter and a yagi strapped to the back of my
truck, (about a 5ft piece of wood) i had no trouble establishing contact at
13km and also 19km -all line of sight, i didn't do any actual test of
thruput but the connection 'felt' solid. I was surprised with the results i
got and intend to follow up with a more experiments when the weather
improves :-)
right now i am using the link to surf the net from my home to place of work

If you have line of sight i would be tempted to try the link with just a
couple of good antennas before investing in RF amps...
good luck

>
>Would you share the details of the RF amplifier and antennas you are using ?
>I have 4 bds from the buy which I've been using intrabuilding. I now want
>to set up a 6 mile link, and a 1 mile link, both going into a hub. The
>distant ends are in
>line with each other, so a directional antenna at the hub may work.
>Suggestions appreciated !
>
>73 David de KB9KNS
>
>
>(Am cordless; will travel.)   --taylord@ecn.purdue.edu
>
>
>
>
>
cheers
Fred Kehler
Clearbrook Technical Services Ltd
voice 604 850-3010

123. Re: [SS:704] Re: linux wavelan drivers

From: wb9mjn@wb9mjn.ampr.org
Date: Wed, 18 Dec 96 21:46:56 UTC
To: ss@tapr.org
Message-ID: <11732@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Fred Kehler,

  I m currious what ISM band the Wavelan cards you are using are on. I be-
lieve there are 915, and 2.4 Ghz versions of those, right?

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

124. Re: [SS:705] Re: linux wavelan drivers

From: Fred Kehler <clearbrook_technical@mindlink.bc.ca>
Date: Thu, 19 Dec 1996 09:55:54 -0800
To: ss@tapr.org
Message-ID: <199612191755.JAA01163@linux.clrtech.com.>
Rendered body type: text/plain

At 12:16 AM 19/12/96 -0600, you wrote:
>
> Hi Fred Kehler,
>
> I m currious what ISM band the Wavelan cards you are using are on. I be-
>lieve there are 915, and 2.4 Ghz versions of those, right?
>
Hi Don, these are the 915mhz version, I have not had any experience with the
2.4Ghz versions.

>73, Don.
>
>Mailbox : WB9MJN @ N9HSI.IL.USA.NA
>AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
>Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu
>
>
>
>

Fred Kehler
Clearbrook Technical Services Ltd.   clearbrook_technical@mindlink.bc.ca.

125. unsubscribe

From: "Elpidio B. Cardenas" <elpidio@aloha.net>
Date: Thu, 19 Dec 1996 19:16:22 -1000
To: <ss@tapr.org>
Message-ID: <199612200531.TAA22495@haleakala.aloha.net>
Rendered body type: text/plain

[Empty message body]

126. TAPR SS STA Application Available

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 22 Dec 1996 02:44:22 -0600
To: "TAPR-BB list   mailing"<tapr-bb@tapr.org>,
        " Spread Spectrum "<ss@tapr.org>,
        "TAPR Spread Sprctrum" <ss-sta@tapr.org>
Message-ID: <v0300783daee2a2d4daae@[208.134.134.42]>
Rendered body type: text/plain

TAPR SS STA Application On-Line

TAPR requested a Special Temporary Authority ('STA') to conduct an
experimental program to test spread spectrum emissions over amateur radio
facilities on April 10, 1996. On November 6, 1996, the Federal
Communications Commission Wireless Telecommunications Bureau granted the
TAPR request for an STA.

TAPR is making an application for participation in the STA available for
any member of TAPR to use. The URL is: http://www.tapr.org/ss/tapr_sta.html

Please note that all areas of the application must be filled out. These
will be reviewed by the STA holders and a committee within TAPR. The more

detail you can provide in the general answer areas the better.

The STA holders reserve the right to add individuals to or remove
individuals from the STA at anytime. The application will be used in order
to determine eligibility in the STA as well as provide information to the
database and final report of the STA.

Responsibilities of STA stations:

* Stations will be required to maintain the highest standards in
operational practices.
* Stations will be required to submit a report before the end of the STA
that will be used in the final report.
* Stations must have a dependable Internet e-mail service so that
information and discussion regarding the STA can be held.
* Stations must hold at least a Technician Class license
* Stations must be aware that any transmissions conducted pursuant to the
requested STA will be secondary in nature, and must cease immediately in
the event of harmful interference.
* Participants must be a current member of TAPR.

For more information on TAPR check http://www.tapr.org
For more information on TAPR SS information check http://www.tapr.org/ss

---
Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000
---
e-mail: TAPR@TAPR.ORG ftp: ftp.tapr.org   web: http://www.tapr.org
---

127. TAPR Group Purchases on Freewave radios

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 22 Dec 1996 03:39:41 -0600
To: "TAPR-BB list   mailing"<tapr-bb@tapr.org>,
        " Spread Spectrum "<ss@tapr.org>,
        "TAPR Spread Sprctrum" <ss-sta@tapr.org>
Message-ID: <v0300783eaee2ad595420@[208.134.134.42]>
Rendered body type: text/plain

TAPR Group Purchases on Freewave radios

URL: http://www.tapr.org/ss

TAPR has worked an agreement with FreeWave Technologies, Inc. of Boulder,
CO to make there 902-928Mhz 115Kbps radio available to the amateur radio
community. This is an exciting deal and TAPR hopes to be make other
High-Speed SS radios available to amateur radio operators in the future.

TAPR will be taking orders in batches of 50+ units and will try to make a
buy at the end of each month, until such time as members no longer require
radios.

These units will be useful under the current TAPR SS STA
(http://www.tapr.org/ss/tapr_sta.html). These radios can be used under part
15 rules after the TAPR SS STA expires or the amateur rules do not change
significantly enough for their use under Part 97 in the future.

Profits made from these group buys will be used to fund future TAPR
projects and to pay past and future TAPR regulatory efforts.

Technical Specifications:
   * Freewave DGR-115 spread spectrum transceivers
   * Frequency hopping spread spectrum
   * Uncompressed data rates of 115.2 KBaud (serial) 173kbaud on radio
   * Distances of 20 miles or more
   * 1 Watt output power
   * Bandpass Filter
   * All transceivers are assigned a unique electronic serial number
   * -40□ C to +60□ C temp range

See http://www.tapr.org/ss/freewave.html for full details and price.

```
Tucson Amateur Packet Radio
8987-309 E Tanque Verde Rd #337 * Tucson, Az * 85749-9399 * 817-383-0000
------------------------------------------------------------------------
e-mail: TAPR@TAPR.ORG  ftp: ftp.tapr.org   web: http://www.tapr.org
------------------------------------------------------------------------
```

128. Java Web SIte

```
From: John Melton <john@images.demon.co.uk>
Date: Mon, 23 Dec 1996 09:33:01 +0000
To: ss@tapr.org
Cc: dsp93@tapr.org, dsp@tapr.org
Message-ID: <32BE51CD.185B584D@images.demon.co.uk>
Rendered body type: text/plain
```

Hi,

I have started a Web site dedicated to Java and Ham Radio.

    http://www.images.demon.co.uk/java.html

If you know of any more development, let me know and I will add
a link.

Merry Christmas and Happy New Year to all.

John Melton, g0orx/n6lyt

129. Re: [SS:692] Motorola Mitrek?

```
From: roy wilmer <rwilmer@intermind.net>
Date: Mon, 23 Dec 1996 10:49:06 -0800
To: ss@tapr.org
Message-ID: <2.2.32.19961223184906.007005f0@intermind.net>
Rendered body type: text/plain
```

```
At 10:31 PM 12/16/96 -0600, you wrote:
>Hello all.
>Once I heard from some that old Motorola Mitrek tranceiver, can be get in
>south california. I would like to know if some knows whewre to ask for them
>or buy them. or someboby can to sell me ?, I need two or tree working !
>Please let me know.
>
>Sincerely   Memo.
>
>                         xe1ff@amsat.org
>                               or
>                     memo@kim.fcfm.buap.mx
>
>
        I have had good luck with LML  in calif 909-820-1319
        fax at 909-820-1885   email at HRH6@aol.com very slow reply

        they will tune for your freq.
                        Roy wilmer  K7YWF
```

130. UoSat "Merlion" SS Payload

```
From: zeus@myth.demon.co.uk (Mike Cowgill)
Date: Tue, 24 Dec 1996 20:32:45 GMT
To: ss@tapr.org
Message-ID: <31835@myth.demon.co.uk>
Rendered body type: text/plain
```

According to this month's Amsat-UK journal (Oscar news) a Spread Spectrum
payload will floy on the UoSat-12 Merlion satellite. The article says:

"The frequency agile digital S-band downlink is intended for high speed data
transfew and will be employed to perform a variety of communication
experiments. It is capable of low rate spread spectrum communications and has
Viterbi coding options to investigate its performance in the highly dynamic
environment of Low Earth Orbit. The downlink will also be used to perform
link characterisation at those frequancies. The modulation scheme is
NRZ-L/BPSK at 256k, 512k and 1Mbps with square root raised cosine shaping.
This data can be processed via various scramblers and encoders. Data is
scrambled using a standard V.35 scrambler, or via a programmable 32-bit
universal scrambler. A 1/2 rate Viterbi encoder (k=7, G1=171, G2=133) is also
included, and a spread spectrum mode permits experimentation with lower data
rates for smaller ground stations whilst keeping the chip rate at 1Mbps. The
downlink power will be 7W."

Sounds good to me!

Mike.

P.S. The references are:

A.da-Silva-Cunel@ee.surrey.ac.uk

/www.ee.surrey.ac.uk/CSER/UOSAT

131. Re: [SS:712] UoSat "Merlion" SS Payload

From: bruce@satscan.com
Date: Tue, 24 Dec 1996 14:05:25 -0800
To: ss@tapr.org
Message-ID: <199612242205.OAA07132@satscan.com>
Rendered body type: text/plain

>
>According to this month's Amsat-UK journal (Oscar news) a Spread Spectrum
>payload will floy on the UoSat-12 Merlion satellite. The article says:
>
>"The frequency agile digital S-band downlink is intended for high speed data
>transfew and will be employed to perform a variety of communication
>experiments. It is capable of low rate spread spectrum communications and has
>Viterbi coding options to investigate its performance in the highly dynamic
>environment of Low Earth Orbit. The downlink will also be used to perform
>link characterisation at those frequancies. The modulation scheme is
>NRZ-L/BPSK at 256k, 512k and 1Mbps with square root raised cosine shaping.
>This data can be processed via various scramblers and encoders. Data is
>scrambled using a standard V.35 scrambler, or via a programmable 32-bit
>universal scrambler. A 1/2 rate Viterbi encoder (k=7, G1=171, G2=133) is also
>included, and a spread spectrum mode permits experimentation with lower data
>rates for smaller ground stations whilst keeping the chip rate at 1Mbps. The
>downlink power will be 7W."
>
>Sounds good to me!

Sounds good for Ham radio? Yes but, sounds better for the "Little LEO'S"
that want those ham bands for their own use/profit. Are we (Ham Radio) just
doing
their research for them? For free to... For the hams it sounds like it will be
alot of fun hooking up to that satellite at those data rates....

Bruce Weber, KF7PJ, Satscan Corporation / Cascade Technology
PO Box 1109, Sultan WA 98294-1109 (360)-793-3433 FAX: 793-0359

132. ss

From: Tony McConnell <n3jly@erols.com>
Date: Thu, 26 Dec 1996 23:55:43 -0500 (EST)
To: ss@tapr.org
Message-ID: <199612270455.XAA18093@smtp2.erols.com>
Rendered body type: text/plain

the 115Kb radio sounds neat, but i've got a couple of questions...

        How much support do you think these things will eventually get?
        How much support would we need to make it a 'viable mode'?
        Is there anyone else in Baltimore/Washington interesed in experimenting?
        If everyone turns away from this model/mode will there be some warning?
        (if i'm going to own a white elephant i want a pair to breed)

        I'm willing to support the project, i've alalready got an antenna and
        hardline all picked outok i'm game... i'll try the new radio.

        should i apply for the sta first or should i order the radio?

                                Tony McConnell
                                    N3JLI

n3jli is my call, the isp sett the account up verbally over the phone and i
haven't
taken the time to straighten it out. email n3jly@erols.com

133. Re: [SS:714] ss

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 27 Dec 1996 18:40:49 -0600
To: ss@tapr.org
Message-ID: <v0300781daeea19cd9285@[129.120.111.42]>
Rendered body type: text/plain

>the 115Kb radio sounds neat, but i've got a couple of questions...
>
>   How much support do you think these things will eventually get?

A lot. 65 radios were purchased in order to generate the expert 'answer' group and to generate the necessary docs to support subsequent users. As of the announcement, the TAPR office already has another 25 ordered (less than week since the announcement) and I expect that we will be ordering around 100+ radios each month to support various projects. Just a matter of getting the word out and some infrastrcuture started for testing and playing.

>   How much support would we need to make it a 'viable mode'?

What is your defintion of a 'viable mode' ? I find that you need at least 2 radios if you are going to be doing something and no one else is around. 1 radio I think would fit your definiotn of non-viable. :-) The two I am using as I write this e-mail make it very viable as we work towards establishing a network system to support 10 others STA holders in the Denton area by the first of February.

>   Is there anyone else in Baltimore/Washington interesed in
>experimenting?

Not that I know of now. Time to be the first.

>   If everyone turns away from this model/mode will there be some
>warning?

I don't see support for the radio dropping. If the rules are not written in such a way as to allow us to use them under Part 97 after the STA and RM-8737 process is complete, then personally I will use them under Part 15 like everyone else does already. Freewave is probably selling 1000's of these things a week/month. The few hundred that amateurs will eventually have will not be significant to the commercial usage of them. But you should be aware that the Freewave pruchase is a first in a series, I hope, that gets more SS radios into the amateur service. There are people already using WaveLan and I hope that in the long term TAPR or some other amateur will be able produce some radio that does what amateur radio needs, not just a commercial version convertered or operated under Part 97.

>   (if i'm going to own a white elephant i want a pair to breed)

I don't see these as a white elephant, but as with any technology things are going to change. Just depends on how long you want your invesment to last. There are still people using there TNC-1 units. Are those white elephants ? If they are, people are still getting good use out of them. How long will the Freewave radios be good for. As long as you have a communications need for them. I am sure we will be looking at new or better radios, but maybe at a higher price in the next 24 months. The question you have to ask with any technology.....do you want to get in now and have the most time to understand the play with the technology or get in later. I am happy right now with the money I paid for the units. If I throw them away in 6 months, I'll still be happy. Although I think the use will be for 2-3 years inetad of 6 months.

>   I'm willing to support the project, i've alalready got an antenna and
>   hardline all picked outok i'm game... i'll try the new radio.

Sounds like you are set. Just need a radio and then something to push bits.

>   should i apply for the sta first or should i order the radio?

You should do both.

Cheers - Greg, WD5IVD

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

134. Re: [SS:715] Re: ss

From: arutz@shfmicro.com (alan rutz)
Date: Fri, 27 Dec 1996 20:47:23 -0600
To: ss@tapr.org
Message-ID: <199612280247.UAA10067@alice.adsnet.com>
Rendered body type: text/plain

This is news to me! If someone is still using TAPR-1's, and wants another, how about giving me a call? Unless the upgrade we were promised is soon coming, I kind of want to get rid of this albatross....de alan

>>   (if i'm going to own a white elephant i want a pair to breed)
>
>I don't see these as a white elephant, There are still people using there TNC-1 units. Are those white
>elephants ? If they are, people are still getting good use out of them.

---

135. Re: [SS:716] Re: ss

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Fri, 27 Dec 1996 21:43:21 -0600
To: ss@tapr.org
Message-ID: <v03007826aeea47875726@[129.120.111.42]>
Rendered body type: text/plain

Lots of people use TNC-1 with the KISS EPROMs installed. I have one in the corner doing KISS as I type this message. Does a good job.

There was an upgrade to the TNC-1 to make it into a TNC-2 years and years ago. Maybe you are talking about some other upgrade long before I was involved.

Cheers - Greg

>This is news to me! If someone is still using TAPR-1's, and wants another,
>how about giving me a call? Unless the upgrade we were promised is soon
>coming, I kind of want to get rid of this albatross....de alan
>
>>>   (if i'm going to own a white elephant i want a pair to breed)
>>
>>I don't see these as a white elephant, There are still people using there
>TNC-1 units. Are those white
>>elephants ? If they are, people are still getting good use out of them.

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd

---

136. Re: [SS:717] SS digest 197

From: jmorriso@bogomips.com (John Paul Morrison)
Date: Fri, 27 Dec 1996 22:28:21 -0800 (PST)
To: ss@tapr.org
Message-ID: <m0vdsFq-000TtBC@bogomips.com>
Rendered body type: text/plain

> Date: Fri, 27 Dec 1996 18:40:49 -0600
> From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
> To: ss@tapr.org
> Subject: Re: ss
> Message-ID: <v0300781daeea19cd9285@[129.120.111.42]>
>
>
> that gets more SS radios into the amateur service. There are people
> already using WaveLan and I hope that in the long term TAPR or some other
> amateur will be able produce some radio that does what amateur radio needs,
> not just a commercial version convertered or operated under Part 97.

What is the advantage of this 115kbps SS radio, when the WaveLAN does 2Mbps, and costs about the same (US$ 400)? The WaveLan also has DOS, Linux, and NT drivers. The 900MHz WaveLan has 7dBm less power though.

BogoMIPS Research Labs -- bogosity research & simulation -- VE7JPM --
  jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org
----

137. Re: [SS:718] Re: SS digest 197

From: Jeff King <jeff@mich.com>
Date: Sat, 28 Dec 1996 03:05:39 -0500
To: ss@tapr.org
Message-ID: <2.2.32.19961228080539.0068f318@mich.com>
Rendered body type: text/plain

At 12:26 AM 12/28/96 -0600, John Paul Morrison wrote:

>
>What is the advantage of this 115kbps SS radio, when the WaveLAN does
>2Mbps, and costs about the same (US$ 400)? The WaveLan also has DOS,
>Linux, and NT drivers. The 900MHz WaveLan has 7dBm less power though.
>

RX sensitivity of the WaveLan is around -78db. The FreeWave is -110db.
Coupled with the higher power of the FreeWave, that gives it about a
29db system gain advantage over the Wavelan. Also, the FreeWave is a frequency
hopper and as such, is more resistant to inband interference then
the Wavelan which is a low process gain direct sequence radio (I
think its around 10-11db process gain).

Each has there place. I will agree, the drivers for the Wavelan
make it quite attractive.

-Jeff WB8WKA

138. Re: [SS:719] Re: SS digest 197

From: Jeff King <jeff@mich.com>
Date: Sat, 28 Dec 1996 03:59:30 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19961228085930.006cdfec@mich.com>
Rendered body type: text/plain

At 02:12 AM 12/28/96 -0600, Jeff King wrote:

>RX sensitivity of the WaveLan is around -78db. The FreeWave is -110db.
>Coupled with the higher power of the FreeWave, that gives it about a
>29db system gain advantage over the Wavelan.

Hmmm....must be tired.... that should read a ' 39db system gain
advantage over the Wavelan.'

-Jeff WB8WKA
Regards,


```
-------------------------------------
| Jeff King      Aero Data Systems |
| jeff@mich.com  P.O. Box 9325     |
| (810)471-1787  Livonia, MI 48151 |
|F(810)471-0279  United States     |
-------------------------------------
```


139. Re: [SS:718] Re: SS digest 197

From: Steve Sampson <ssampson@n5owk.ampr.org>
Date: Sat, 28 Dec 1996 03:56:32 -0600
To: ss@tapr.org
Message-ID: <32C4EED0.7430@n5owk.ampr.org>
Rendered body type: text/plain

John Paul Morrison wrote:
>
> What is the advantage of this 115kbps SS radio, when the WaveLAN does
> 2Mbps, and costs about the same (US$ 400)? The WaveLan also has DOS,
> Linux, and NT drivers. The 900MHz WaveLan has 7dBm less power though.

I had the impression that the WaveLAN was more for internal use, or a
beam-to-beam between buildings, rather than long range. I think many of
us will find the 900 MHz spectrum to be quite a cesspool of devices.
Let's see, Rabbit TV systems, portable phones, vehicle locators, etc,
etc.
What's the chances of a DS system running 2 Mbps in that environment?
Heck, can you even run 115 kbps, for that matter?

The driver question is a good point. I suspect Freewave has no drivers,
but I may be wrong. I haven't checked their Web page yet. I do know
that Win95 expects to see a dialup modem in dialup networking, so I
guess

most people will use Linux (a SLIP or PPP port should work fine) or one
of the NOS's.

Steve

140. Re: [SS:721] Re: SS digest 197

From: Jeff King <jeff@mich.com>
Date: Sat, 28 Dec 1996 12:31:31 -0500
To: ss@tapr.org, ss@tapr.org
Message-ID: <2.2.32.19961228173131.006ba84c@mich.com>
Rendered body type: text/plain

At 04:06 AM 12/28/96 -0600, Steve Sampson wrote:

>I had the impression that the WaveLAN was more for internal use, or a
>beam-to-beam between buildings, rather than long range. I think many of
>us will find the 900 MHz spectrum to be quite a cesspool of devices.
>Let's see, Rabbit TV systems, portable phones, vehicle locators, etc,
>etc.
>What's the chances of a DS system running 2 Mbps in that environment?

Long range in a metropolitian area, its a risk. I know of a 12 mile LOS
link using WaveLAN's that is flakey, I belive, for the very reasons
you cite.

>Heck, can you even run 115 kbps, for that matter?

Talking to you via a 2 mile FreeWave link right now. Its not line of
sight (heavy trees, buildings). I have a Uniden 900mhz spread spectrum phone
that I use all the time in close proximity to the FreeWaves and it
doesn't seem to affect it (I do hear some popping on the phone however
at the edges of the phones range). The FreeWaves were also tried on the
above mentioned 12 mile LOS link and were quite solid.

>
>The driver question is a good point. I suspect Freewave has no drivers,
>but I may be wrong. I haven't checked their Web page yet. I do know
>that Win95 expects to see a dialup modem in dialup networking, so I
>guess
>most people will use Linux (a SLIP or PPP port should work fine) or one
>of the NOS's.
>
>Steve

I'm using Trumpet Winsock 3.0 on my FreeWave with Win95. The other end is
using PPP on Linux. Trumpet can be configured to run PPP over a null modem
cable which is what the FreeWave looks like to it. I am planning on going
to some flavor of nos/linux configured as a router as I want to hang more
machines off the Freewave then just this one.

-Jeff WB8WKA

141. Re: [SS:722] Re: SS digest 197

From: George Cserenyi <zsolt@direct.ca>
Date: Sat, 28 Dec 1996 11:13:29 -0800 (PST)
To: ss@tapr.org
Message-ID: <Pine.LNX.3.91.961228111017.28821A-100000@boxer.direct.ca>
Rendered body type: text/plain

On Sat, 28 Dec 1996, Jeff King wrote:

> At 04:06 AM 12/28/96 -0600, Steve Sampson wrote:
>
> >I had the impression that the WaveLAN was more for internal use, or a
> >beam-to-beam between buildings, rather than long range. I think many of
> >us will find the 900 MHz spectrum to be quite a cesspool of devices.
> >Let's see, Rabbit TV systems, portable phones, vehicle locators, etc,
> >etc.
> >What's the chances of a DS system running 2 Mbps in that environment?
>
> Long range in a metropolitian area, its a risk. I know of a 12 mile LOS
> link using WaveLAN's that is flakey, I belive, for the very reasons
> you cite.
>
> >Heck, can you even run 115 kbps, for that matter?
>
> Talking to you via a 2 mile FreeWave link right now. Its not line of
> sight (heavy trees, buildings). I have a Uniden 900mhz spread spectrum phone
> that I use all the time in close proximity to the FreeWaves and it

How hard would it be to adapt one of these phones to carry data xmissions
as well/instead of voice? What speed could we hope for and how much does
a pair of these Uniden 900mhz spread spectrum phones cost?
George

> doesn't seem to affect it (I do hear some popping on the phone however
> at the edges of the phones range). The FreeWaves were also tried on the
> above mentioned 12 mile LOS link and were quite solid.
>
> >
> >The driver question is a good point. I suspect Freewave has no drivers,
> >but I may be wrong. I haven't checked their Web page yet. I do know
> >that Win95 expects to see a dialup modem in dialup networking, so I
> >guess
> >most people will use Linux (a SLIP or PPP port should work fine) or one
> >of the NOS's.
> >
> >Steve
>
> I'm using Trumpet Winsock 3.0 on my FreeWave with Win95. The other end is
> using PPP on Linux. Trumpet can be configured to run PPP over a null modem
> cable which is what the FreeWave looks like to it. I am planning on going
> to some flavor of nos/linux configured as a router as I want to hang more
> machines off the Freewave then just this one.
>
> -Jeff WB8WKA
>
>

142. Re: [SS:722] Re: SS digest 197

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sat, 28 Dec 1996 12:57:38 -0600
To: ss@tapr.org
Message-ID: <v03007810aeeb180b77e4@[129.120.111.42]>
Rendered body type: text/plain

>At 04:06 AM 12/28/96 -0600, Steve Sampson wrote:
>
>>I had the impression that the WaveLAN was more for internal use, or a
>>beam-to-beam between buildings, rather than long range. I think many of
>>us will find the 900 MHz spectrum to be quite a cesspool of devices.
>>Let's see, Rabbit TV systems, portable phones, vehicle locators, etc,
>>etc.
>>What's the chances of a DS system running 2 Mbps in that environment?

There seems to be a urban myth about the 'cesspool of devices' on 900Mhz.

While there is a lot of Part 15 and other devices on 900Mhz, it all depends
on what you operate. While some modes might be effected by existing users
on the band, I think we will find that most SS systems that seem to have
problems operating are due to radio issues (i.e. poor bandpass filters, not
a good path, bad feedline selection, etc) than any loss of communications
due to other operations interfering with the signal. Based on what I hear
people talking about and seeing myself, 9913 coax and worse don't cut it
for 900Mhz and up. Having the beams not pointed at each other don't work
very well. Having the beam mounted on the horz antenna (which I have seen
an amateur do :-) don't work. I know Glenn can tell stories about the
importance of good RF path design.

>From the operations I have been doing the last several weeks, I had more
problems with the pagers just above the top end of the band running
1000-2000 watts at each node then I had with anything in band. The two
cordless phones here at the house neither interfer or get interferred with
by the radio. Yes, if I stick the cordless phone right next to the unit I
can hear the cracks, but that is more front end desense then anything.
Also, my several other Part 15 devices work just fine with the radio
transferring lots of data.

The pager issue was easily corrected by changing to horz polarization
(dropping the signals 20-30db) and adding a bandpass to the one radio that
didn't have a bandpass (one of the units here is a pre-production unit that
was mfg before they added bandpass filters to all the radios).

Now I am getting 5 miles non-line of sight path with one end using a beam
and the other end -- which is sitting here now -- running off the snub
antenna. I can drive around town and get a good 5 mile radius around the 3
story building hosting the radio connected to the Internet. If I take a
beam with me and stop every so often and point the beam back at the hub

site I can get easily 10+ miles. The hub site is not a very good located
site. That is with the hub site at 1 watt and the other unit I have at
400mw. Based on what Jeff and Dewayne have been doing with the radios,
that can easily make the 20+ miles with decent antennas, detail to feedline
and filters, and watching where you try to shot a path.

I am really looking forward to getting one of Bob Morgans Horz Omnis up
when we has some prototypes to play with.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

143. Re: [SS:719]...

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Sat, 28 Dec 1996 11:15:17 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612281915.LAA02879@wireless.net>
Rendered body type: text/plain

In [SS:719], Jeff King <jeff@mich.com> wrote:

>RX sensitivity of the WaveLan is around -78db. The FreeWave is -110db.
>Coupled with the higher power of the FreeWave, that gives it about a
>29db system gain advantage over the Wavelan. Also, the FreeWave is a
>frequency
>hopper and as such, is more resistant to inband interference then
>the Wavelan which is a low process gain direct sequence radio (I
>think its around 10-11db process gain).

>-Jeff WB8WKA

A comment (for clarification): The WaveLAN system uses DQPSK modulation
and a 11-bit Barker code to spread a 2Mbps signal across 22MHz of spectrum.
Conventional wisdom says that the spreading gain is 10 log 11, a value
just larger than 10dB (the required minimum under Part 15). I have
less information about the FreeWave, but I do know that it's FM signal
is normally hopping around over 100+ hopping channels. Assuming that
the channels don't overlap (another Part 15 assumption) and that the
number of channels is exactly 100, the process gain is 10 log 100 or
20 dB. Since the number is slightly larger, perhaps the gain is nearer
21 dB. It's worth noting also, there there is roughly an order of
magnitude difference in datarate ratio between the two systems--one order
of magnitude is usually considered 10 dB (taken as a pwer ratio).

A question: Normally, receiver sensitivities are measured in dBm at
corresponding BER. In the numbers cited, do we have any information
that tells us that the BER's are equivalent, so that we are comparing
apples with apples? If the numbers are representative of equivalent
BER's (a large IF), then the 32 dB difference is really 22 dB in
merit (when one considers the datarate ratio). I suspect the number is
nearer 10 dB, but it sure would be nice to know for sure.

Very best Holiday Wishes to all on the list.

/bob K6KGS

144. Freewave Radio Operation

From: "Ron Cole" <rdcole@mindspring.com>
Date: Sat, 28 Dec 1996 19:28:56 +0000
To: ss@tapr.org
Message-ID: <199612290128.BAA38832@mule1.mindspring.com>
Rendered body type: text/plain

Well I have a few questions about the Freewave Radios.

1) Since these are Part 15 Radios, What changes are being made that
cause them to have to be operated under part 97, and thus the
restrictions that imposes?

2) Does the Hopping allow the radios to be placed back to back on
seperate antennas to form a Link or Repeater ?

3) Any body running Voice over these radios ? Like using one of the
lossy data compressions available for PC or MAC.

Ron Cole
N5HYH

145. Re: [SS:723] Cordless 900 MHz Conversion

From: "Lee W. Fry" <lfry@mindspring.com>
Date: Sun, 29 Dec 1996 07:34:19 -0500
To: ss@tapr.org
Cc: George Cserenyi <zsolt@direct.ca>
Message-ID: <2.2.32.19961229123419.0039c7a0@mindspring.com>
Rendered body type: text/plain

At 12:07 PM 12/28/96 -0600, George Cserenyi <zsolt@direct.ca> wrote:

>How hard would it be to adapt one of these phones to carry data xmissions
>as well/instead of voice? What speed could we hope for and how much does
>a pair of these Uniden 900mhz spread spectrum phones cost?

You might be able to adapt a so-called digital SS phone that internally uses
a separate codec chip to digitize the audio for transmission.

Some manufacturers even suggest using their chip sets in a data-only mode.
Alfa's 9001 cordless phone chip - see
http://ns1.2win.com/alfa/wireless.html can be run at 64 kbps full duplex or
160 kbps half duplex in data mode.

I have recently seen refurbished digital SS phone sets (brand unspecified)
advertised at US$50 each.

Lee W. Fry AA0JP
lfry@mindspring.com
See my Part 15 Spread Spectrum Device Compendium at:
http://www.mindspring.com/~lfry/part15.htm

146. Re: [SS:726] Freewave Radio Operation

From: wb9mjn@wb9mjn.ampr.org
Date: Sun, 29 Dec 96 11:41:33 UTC
To: ss@tapr.org
Message-ID: <11805@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Ron,

   On the idea of multiple radios, at a single site. No radios can operate
with the Receiver front end overloaded. The signal out of these radios is
30 dBm. Few receivers, can operate with a 30 dBm signal. Antenna isolations
is possible tho. I make a patch antenna, with is unidirectional, with in
excess of 20 dB F/B ratio. Altho I have not verifyed this, with an additional
10 to 20 dB of spacing isolation, 50 to 60 dB of isolation between radios
at a site could be obtained. And there is good probability that the freewave
radios will be able to operate with a -20 to -30 dBm interfering signal level,
on a different hopping code! Sounds like a good experiment!!

147. Re: [SS:723] Cordless 900 MHz Conversion

From: George Cserenyi <zsolt@direct.ca>
Date: Sun, 29 Dec 1996 11:02:28 -0800 (PST)
To: "Lee W. Fry" <lfry@mindspring.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.91.961229110122.32243B-100000@boxer.direct.ca>
Rendered body type: text/plain

Mni thanks Lee,
        gud news, indeed.

On Sun, 29 Dec 1996, Lee W. Fry wrote:

> At 12:07 PM 12/28/96 -0600, George Cserenyi <zsolt@direct.ca> wrote:
>
> >How hard would it be to adapt one of these phones to carry data xmissions
> >as well/instead of voice? What speed could we hope for and how much does
> >a pair of these Uniden 900mhz spread spectrum phones cost?
>
> You might be able to adapt a so-called digital SS phone that internally uses
> a separate codec chip to digitize the audio for transmission.
>
> Some manufacturers even suggest using their chip sets in a data-only mode.

> Alfa's 9001 cordless phone chip - see
> http://ns1.2win.com/alfa/wireless.html can be run at 64 kbps full duplex or
> 160 kbps half duplex in data mode.
>
> I have recently seen refurbished digital SS phone sets (brand unspecified)
> advertised at US$50 each.
>
> Lee W. Fry AA0JP
> lfry@mindspring.com
> See my Part 15 Spread Spectrum Device Compendium at:
> http://www.mindspring.com/~lfry/part15.htm
>
>

148. Re: [SS:726] Freewave Radio Operation

From: Steve Sampson <ssampson@oklahoma.net>
Date: Sun, 29 Dec 1996 12:06:40 -0600
To: ss@tapr.org
Message-ID: <32C6B330.2FA7@oklahoma.net>
Rendered body type: text/plain

Ron Cole wrote:
>
> Well I have a few questions about the Freewave Radios.
>
> 1) Since these are Part 15 Radios, What changes are being made that
> cause them to have to be operated under part 97, and thus the
> restrictions that imposes?

I can envision the need for some sites to require more power than
allowed under Part 15 rules. The only people that can use more power
is the Government and users operating under the TAPR STA. While on
first blush, there seems to be no advantage in operating under Part 97,
it is only because the current devices are designed for limited bands.

Let's say the STA is a success, and the FCC writes the rules for all
bands above 10 MHz to be authorized SS modes. In this case, the
experiance gained now, using commercial equipment, can be easily
designed for future Ham equipment. I think the first HF band to
be converted to SS will be the Part 95 allocation. Combined with
FM, the FCC can easily cut down on 95% of its enforcement budget.
(Part 95 == CB Radio). Just think what 4 Watts and 100 hopping
channels would do for the utility. Wouldn't be good for data, but
great for voice.

> 2) Does the Hopping allow the radios to be placed back to back on
> seperate antennas to form a Link or Repeater ?

Would there be any advantage in that? As sold, I believe most of
these devices use a scheme similar to what we know as "digipeaters."
You "digi" through a central node to another device. Most just allow
one "digi" rather than the AX.25 8 "digis." At the higher speeds
I wouldn't want to confine everyone to the same hopping channel.
Although for emergency operations, that seems like a good idea.
That is, reduce the throughput to increase the utility.

For example, a plane crashes in an open field thirty miles outside
of the city. One vehicle goes to the site, strings a phone and a
10Base-T concentrator. Another vehicle heads for high ground at the
15 mile radius, and operates as a "digi" between the site and the
Internet Hub. I wouldn't expect the "scene" to be fully connected
to the internet, only transfering Jet (TM) database entries, for
example, from a local LAN, or possibly MS-Mail.

> 3) Any body running Voice over these radios ? Like using one of the
> lossy data compressions available for PC or MAC.

That's an interesting area. The 115 kbps speed of the FreeWave devices
makes voice as easy as using internet voice applications, or even
applications designed to combine data and voice.

Steve

149. Re: [SS:725] Re: ..

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Sun, 29 Dec 1996 19:01:45 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199612291901.TAA12305@lynx.ve3jf.ampr.org>

Rendered body type: text/plain

Bob K6KGS wrote:

> In [SS:719], Jeff King <jeff@mich.com> wrote:
>
> >RX sensitivity of the WaveLan is around -78db. The FreeWave is -110db.
> >Coupled with the higher power of the FreeWave, that gives it about a
> >29db system gain advantage over the Wavelan. Also, the FreeWave is a
> >frequency
> >hopper and as such, is more resistant to inband interference then
> >the Wavelan which is a low process gain direct sequence radio (I
> >think its around 10-11db process gain).
>
> >-Jeff WB8WKA
>
> A comment (for clarification): The WaveLAN system uses DQPSK modulation
> and a 11-bit Barker code to spread a 2Mbps signal across 22MHz of spectrum.
> Conventional wisdom says that the spreading gain is 10 log 11, a value
> just larger than 10dB (the required minimum under Part 15). I have
> less information about the FreeWave, but I do know that it's FM signal
> is normally hopping around over 100+ hopping channels. Assuming that
> the channels don't overlap (another Part 15 assumption) and that the
> number of channels is exactly 100, the process gain is 10 log 100 or
> 20 dB. Since the number is slightly larger, perhaps the gain is nearer
> 21 dB. It's worth noting also, there there is roughly an order of
> magnitude difference in datarate ratio between the two systems--one order
> of magnitude is usually considered 10 dB (taken as a pwer ratio).
>
> A question: Normally, receiver sensitivities are measured in dBm at
> corresponding BER. In the numbers cited, do we have any information
> that tells us that the BER's are equivalent, so that we are comparing
> apples with apples? If the numbers are representative of equivalent
> BER's (a large IF), then the 32 dB difference is really 22 dB in
> merit (when one considers the datarate ratio). I suspect the number is
> nearer 10 dB, but it sure would be nice to know for sure.

Time for some back-of-the-envelope calculations...

FreeWave:

The manufacturer claims that the modem achieves 10E-4 BER at the -110
dBm signal level. Since it is, I think, noncoherent FSK, this would
require an Eb/N0 of about 12.5 dB. If I recall correctly, the raw bit
rate of the modem is about 173 kbps. Assuming for the moment that the
bandwidth efficiency is 1 bps/Hz, the required SNR is also 12.5 dB, and
the thermal noise power is about -121.5 dBm in a 173 KHz bandwidth.
Since the modem is described as "GFSK", the bandwidth efficiency could
be higher than 1 - perhaps as high as 1.6 (like in the GSM cellular
system), but that doesn't really change the analysis. So, if the front
end of the modem was noiseless, the required signal level for 10E-4 BER
would be -121.5 + 12.5 = -109 dBm. If we assume a reasonable noise
figure, say 3 dB, then it becomes -106 dBm. So, either the claimed
figure of -110 dBm is too good to be true, or some of my assumptions are
false - probably the latter. :-) Comments?

WaveLAN:

It appears from the specs in the Lucent web pages that the -78 dBm
figure is for 10E-8 BER. The modem is DQPSK, which is nearly equivalent
to coherently demodulated QPSK at low BER... the required Eb/N0 for
10E-8 BER should be about 13 dB, and the SNR then about 16 dB. Assuming
that the (despread) bandwidth is close to 1 MHz, the thermal noise power is
-114 dBm. An article I have on WaveLAN suggests that the noise figure
is about 7 dB, so this would bring the noise power up to -107 dBm. With
no implementation loss, the modem should then deliver 10E-8 BER with
signal power at the input of -107 + 16 = -91 dBm. This is 13 dB better
than their spec, which indicates some serious shortcomings in the modem
implementation, or again, some faulty assumptions on my part. For 10E-4
BER, the required signal power should be about -94 dBm... so in theory,
it should only be of the order of 12 dB higher than for FreeWave, but
theory doesn't seem to match reality in this case.

So, based on this admittedly fuzzy analysis, FreeWave seems to be an
overachiever, and WaveLAN an underachiever. It would be nice to get
some hard BER data on these units, but the problem is that it's usually
very hard to get at the raw modems to get the bits in and out.

Quite apart from the differences in performance due to different
bandwidths, noise figures and modem implementations, the FreeWave units

will clearly have a big edge over WaveLAN if strong narrowband
interference is encountered. They will also be less vulnerable to ISI
caused by multipath, by virtue of the longer symbol length. The bottom
line is: what you gain in speed, you lose in range and robustness.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

150. Re: [SS:730] Re: Freewave Radio Operation

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Sun, 29 Dec 1996 12:18:53 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612292018.MAA04593@wireless.net>
Rendered body type: text/plain

To expand on what Steve Sampson <ssampson@oklahoma.net> wrote, specifically:

> 3) Any body running Voice over these radios ? Like using one of the
> lossy data compressions available for PC or MAC.

That's an interesting area. The 115 kbps speed of the FreeWave devices
makes voice as easy as using internet voice applications, or even
applications designed to combine data and voice.

I do this routinely, as does Bernie Doerner NU1S. We like a Windows95
application SpeakFreely (http://www.fourmilab.ch/) that uses a
compliant sound card with a mic attached, uses UDP to talk across
the Internet. This app is a long way up the protocol stack from the
PPP link over a FreeWave (or ethernet link using WaveLAN), but the
connectivity and the conversation works just fine. Bernie has a notebook
with built-in microphone and PCMCIA-version of WaveLAN, and he's been
spotted while Nike-mobile (walking around the campus of WPI) while
voice reporting his coverage findings. Now that's WIRELESS voice.

Happy New Year all!!

best regards/bob K6KGS

151. Re: [SS:730] Re: Freewave Radio Operation

From: Kevin Jessup <kevin.jessup@mail.mei.com>
Date: Sun, 29 Dec 1996 14:20:17 -0600
To: ss@tapr.org
Message-ID: <01IDL2TMWTMQ8Y0IG4@meipws.mis.mei.com>
Rendered body type: text/plain

At 12:14 PM 12/29/96 -0600, Steve Sampson <ssampson@oklahoma.net> wrote:
>Ron Cole wrote:

>> 3) Any body running Voice over these radios ? Like using one of the
>> lossy data compressions available for PC or MAC.

>That's an interesting area. The 115 kbps speed of the FreeWave devices
>makes voice as easy as using internet voice applications, or even
>applications designed to combine data and voice.

Yes. I'm running CU-SeeMe (video, audio and text) between
home and work on my NT box with an ISDN line. Works great.

Also, doesn't the TDMA cellular standard work fine with
compressed 9600 baud voice?   The FreeWaves have more than
enough to handle telephone quality audio.

I've played with the commercial versions of the FreeWave SS
radios. Nice rigs.   Now that I can get a decent price on
these via TAPR, I just can NOT find any other hams in the
Milwaukee area (I'm actually 20 miles North of Milwaukee)
interested in digital other than AMTOR, PACTOR or 1200 baud
2-meter work.   Bummer.

Maybe I'll just buy two and do my own work.   I've been trying
to drum up interest in SS around here for the past three years.
Even put on a demo at a couple of the area clubs, complete with
a $25,000 spectrum analyzer and both HF and DS SS equipment.
But no luck.   Nobody wants to experiment around here.

FreeWave purchase or not, I need to get a membership application
and dues into TAPR. Thanks for all your effort!

Kevin, n9sqb
--
Kevin Jessup
software engineer
Marquette Medical Systems
http://www.mei.com
kevin.jessup@mail.mei.com
PGP encrypted Email preferred

"Rest enough for the individual man - [but] too
much or too soon and we call it Death. But for
MAN, no rest and no ending. He must go on,
conquest beyond conquest...and when he has
conquered all the depths of space and all the
mysteries of time, still he will be beginning."
-- H.G. Wells, Things To Come

152. Re: [SS:731] Re: ..

From: wb9mjn@wb9mjn.ampr.org
Date: Sun, 29 Dec 96 15:56:05 UTC
To: ss@tapr.org
Message-ID: <11813@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Barry,

Been looking at ur numbers, and can t see where u went wrong with the Freewave figuring. The only guess would be that they are using coherent GFSK, and that might result in a better Eb/N0 to start with.

Here s some comments to the group, in general, about Noise. A -110 dBm for 10e-4 specification is for a test situation. Where the test equipment represents a ambient temperature source. In the real world, connected to an antenna, there are two additional noise sources. Line loss, and enviormental RF noise.

For example, a 2 dB Noise Figure, radio, tested on a bench, would see noise equivalent to a 290 degree Kelvin from a generator, plus 169.6 degrees due to the noise performance of the front end, for a total of 459.6 degrees Kelvin.

Attached to an antenna, using Reference Data for Radio Engineers reference I used for my "Cellular Area Coverage Transport Networks" ARRL CNC paper, the suburban level of noise at 900 Mhz, is 2 dB above ambient, or 460 degrees. A 1 dB transmission line loss , in combination with the noise figure yields a 288.6 degree Kelvin additional noise temperature. For a new total of 748.6 degrees Kelvin.

Thus, a radio that tested with -110 dBm 10e-4 BER from a generator will have a 10e-4 BER at 107.9 dBm. The RF Path calculation have to deliver a signal in excess of this -107.9 dBm level to get 10e-4 or better BER performance NOT -110 dBm.

The equation used for these calculations is:

 Tequiv. = Tant + (LF-1) Tambient

Tant is the enviormental Noise level at the antenna, or the ambient room temperature for an ideal piece of test equipment.

Tambient is the Ambient temperature of the enviorment, 290 degrees Kelvin in this example.

L is the Loss Factor of the RF path between the Antenna, and the receiver, that is 10 to the (Attenuation in dB/10).

F is the Noise Factor of the receiver. That is, 10 to the (Noise Figure in dB/10).

The enviormental Noise temperature, according to the reference, can vary between 2 dB above ambient (suburban) to as much as 17 dB above ambient (urban).

That s at 900 Mhz.

So, the point is, that a specification like -110 dBm for 10e-4 BER is not a directly useable number. It needs to be modified by the system parameters to get a number that is useful. Note, that the Line loss effected noise level, but it also effects the path loss. So, that 1 dB in the example has a negative impact, again. □□□□□

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA

AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

153. RE: 725] Re:

From: David Dennis <ddennis@metronet.com>
Date: Sun, 29 Dec 1996 12:04:41 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBF5D7.C6637080@dal132.metronet.com>
Rendered body type: text/plain

A question: Normally, receiver sensitivities are measured in dBm at
corresponding BER. In the numbers cited, do we have any information
that tells us that the BER's are equivalent, so that we are comparing
apples with apples? If the numbers are representative of equivalent
BER's (a large IF), then the 32 dB difference is really 22 dB in
merit (when one considers the datarate ratio). I suspect the number is
nearer 10 dB, but it sure would be nice to know for sure.

Very best Holiday Wishes to all on the list.

/bob K6KGS

This is an excellent point. I was thinking the same thing while reading all the quotes about power budgets.

154. Re: [SS:728] Re: Freewave Radio Operation

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 29 Dec 1996 22:05:23 -0600
To: ss@tapr.org
Message-ID: <v03007808aeeceed08b38@[129.120.111.42]>
Rendered body type: text/plain

Hi Ron.

I have two Freewave radios setting back to back right now -- one using a
vert and the other horz beam (all the antennas I had around for the test).
They are operating on two different channels (i.e. hop sequences) and
feeding the serial connections between them.

Wanted to test it this for an upcoming event where we need one hop to get
to the far end site, but didn't want to install a computer or something
else at the temp site for the event.

While the Freewave radios support a repeater mode, no one in their right
mind would want to lose 50% throughput, when all that is required is a
second radio to send the data along on a second channel.

While many radios might not work transmitting next to each other, the
Freewaves on different hop channels certainly do -- at least the pairs I
have going here.

Cheers - Greg

>Don (mjn) wrote :
> Hi Ron,
>
> On the idea of multiple radios, at a single site. No radios can operate
>with the Receiver front end overloaded. The signal out of these radios is
>30 dBm. Few receivers, can operate with a 30 dBm signal. Antenna isolations
>is possible tho. I make a patch antenna, with is unidirectional, with in
>excess of 20 dB F/B ratio. Altho I have not verifyed this, with an additional
>10 to 20 dB of spacing isolation, 50 to 60 dB of isolation between radios
>at a site could be obtained. And there is good probability that the freewave
>radios will be able to operate with a -20 to -30 dBm interfering signal level,
>on a different hopping code! Sounds like a good experiment!!
>
>

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

155. Re: [SS:730] Re: Freewave Radio Operation

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 29 Dec 1996 22:17:15 -0600
To: ss@tapr.org
Message-ID: <v03007809aeecf07aef82@[129.120.111.42]>
Rendered body type: text/plain

>Ron Cole wrote:
>>
>> Well I have a few questions about the Freewave Radios.
>>
>> 1) Since these are Part 15 Radios, What changes are being made that
>> cause them to have to be operated under part 97, and thus the
>> restrictions that imposes?
>
>I can envision the need for some sites to require more power than
>allowed under Part 15 rules. The only people that can use more power
>is the Government and users operating under the TAPR STA. While on
>first blush, there seems to be no advantage in operating under Part 97,
>it is only because the current devices are designed for limited bands.
>

The answer to this is easy. No changes are being made to the equipment for the most part. What changes are made to other types of commerical equipment that are used under Part 97 on 440, 2, and other bands -- answer is probably none. The TAPR SS STA allows for better antennas and the ability to use other codes than currently defined under Part 97.

The reason for wanting to change the rules in order to use existing equipment and technology being developed commerically is because it is Part 97. As amateurs we want to be doing amateur radio. We could easily be off doing part 15 stuff, but by not pursuing the usefulness of 900Mhz and other bands for Part 97 operations, we forfeit any rights in the future when Part 97 modes want to be doing things when a secondary services is already there.

The reason for both RM-8737 and the TAPR SS STA is because as amateurs we want to be doing things under Part 97, not Part 15 or other regulations.

Dewayne and myself both hope that the TAPR SS STA will allow many more hams to look at the mode and get involved with operating. No telling what the potential is when you get more people involved with diverse talents.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

156. RE: 731] Re: ..

From: David Dennis <ddennis@metronet.com>
Date: Sun, 29 Dec 1996 22:56:06 -0600
To: "'ss@tapr.org'" <ss@tapr.org>
Message-ID: <01BBF5DB.CD370A80@dal132.metronet.com>
Rendered body type: text/plain

Bob K6KGS wrote:

Time for some back-of-the-envelope calculations...

FreeWave:

The manufacturer claims that the modem achieves 10E-4 BER at the -110 dBm signal level. Since it is, I think, noncoherent FSK, this would require an Eb/N0 of about 12.5 dB. If I recall correctly, the raw bit rate of the modem is about 173 kbps.
        I may be wrong but I think you may mean 173kBd.

  Assuming for the moment that the
bandwidth efficiency is 1 bps/Hz,

        Here again I may be wrong and I surely would like to know but I think if this is NRZ data then you can assume 2 Baud / Hz.

 the required SNR is also 12.5 dB, and
the thermal noise power is about -121.5 dBm in a 173 KHz bandwidth.
Since the modem is described as "GFSK", the bandwidth efficiency could be higher than 1 - perhaps as high as 1.6 (like in the GSM cellular system), but that doesn't really change the analysis. So, if the front

end of the modem was noiseless, the required signal level for 10E-4 BER
would be -121.5 + 12.5 = -109 dBm. If we assume a reasonable noise
figure, say 3 dB, then it becomes -106 dBm. So, either the claimed
figure of -110 dBm is too good to be true, or some of my assumptions are
false - probably the latter. :-) Comments?

WaveLAN:

It appears from the specs in the Lucent web pages that the -78 dBm
figure is for 10E-8 BER. The modem is DQPSK, which is nearly equivalent
to coherently demodulated QPSK at low BER... the required Eb/N0 for
10E-8 BER should be about 13 dB, and the SNR then about 16 dB. Assuming
that the (despread) bandwidth is close to 1 MHz, the thermal noise power is
-114 dBm. An article I have on WaveLAN suggests that the noise figure
is about 7 dB, so this would bring the noise power up to -107 dBm. With
no implementation loss, the modem should then deliver 10E-8 BER with
signal power at the input of -107 + 16 = -91 dBm. This is 13 dB better
than their spec, which indicates some serious shortcomings in the modem
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BER, the required signal power should be about -94 dBm... so in theory,
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theory doesn't seem to match reality in this case.

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some hard BER data on these units, but the problem is that it's usually
very hard to get at the raw modems to get the bits in and out.

Quite apart from the differences in performance due to different
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will clearly have a big edge over WaveLAN if strong narrowband
interference is encountered. They will also be less vulnerable to ISI
caused by multipath, by virtue of the longer symbol length. The bottom
line is: what you gain in speed, you lose in range and robustness.

Barry

        Where can I find some info that relates S/N required for a specific BER?
        In the fiber optic systems I work with we assume 10.9dB for a BER 1e-9 but
        I dont know what to assume for different BERs.

157. Re: [SS:738] RE: 731] Re: ..

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Sun, 29 Dec 1996 23:48:53 -0600
To: ss@tapr.org
Message-ID: <v03007805aeed07820906@[129.120.111.42]>
Rendered body type: text/plain

>Barry
>
>   Where can I find some info that relates S/N required for a specific
>BER?
>   In the fiber optic systems I work with we assume 10.9dB for a BER
>1e-9 but
>   I dont know what to assume for different BERs.

Tom McDermott's, N5EG, new book has an entire chapter related to this
issue. Look over the contents
http://www.tapr.org/tapr/html/pub.wdcdat.html Chapter 2 is the one you
might want to look at.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

158. Re: [SS:736] Re: Freewave Radio Operation

From: Dewayne Hendricks <dewayne@warpspeed.com>
Date: Mon, 30 Dec 1996 04:30:21 -0800
To: ss@tapr.org
Message-ID: <v03010d02aeed64b9d770@[204.118.182.20]>
Rendered body type: text/plain

At 22:46 -0600 12/29/96, Greg Jones, WD5IVD wrote:
>While many radios might not work transmitting next to each other, the

>Freewaves on different hop channels certainly do -- at least the pairs I
>have going here.

I can confirm this. I recently helped the FreeWave people setup a radio link to their local ISP from their Boulder facility. I setup a PC running NOS and have five radios connected to it at 115 Kbps. One of the radios is a pt-pt link to the ISP, and the other four radios are pt-pt links to their employees homes. All of the radios operate on different hopping patterns and although their respective antennas are in quite close proximity they don't interfer with each other.

-- Dewayne

--
~~~~~~
Dewayne Hendricks, WA8DZP ! AOL: HENDRICKS
Warp Speed Imagineering ! Internet: dewayne@warpspeed.com
43730 Vista Del Mar ! Packet Radio: WA8DZP @ K3MC.#NOCAL.CA.USA.NOAM
Fremont, CA 94539-3204 ! WWW: <http://www.warpspeed.com/>
Fax: (510) 770-9854 !
~~~~~~

159. Re: [SS:725] Re: ..

From: Phil Karn <karn@qualcomm.com>
Date: Mon, 30 Dec 1996 04:41:09 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612301241.EAA14254@servo.qualcomm.com>
Rendered body type: text/plain

Remember also if you're going to compare the sensitivities of different radios you also have to allow for the different data rates. It's not fair to say that radio A is 30 dB "better" then radio B if radio B runs at 1000x the data rate...

Phil

160. Re: [SS:741] Re: ..

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Mon, 30 Dec 1996 07:17:29 -0600
To: ss@tapr.org
Message-ID: <v0300780faeed70d2d633@[129.120.111.42]>
Rendered body type: text/plain

Phil,

Someone said the other day that FHSS have no process gain. Is this a correct statement ? I had thought that FHSS and DSSS both had process gain.

Did I miss something ?

Cheers - Greg

>Remember also if you're going to compare the sensitivities of different
>radios you also have to allow for the different data rates. It's not fair
>to say that radio A is 30 dB "better" then radio B if radio B runs at
>1000x the data rate...
>
>Phil

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
---

161. Re: .. Process Gain

From: morganb@inetport.com (Robert B. Morgan)
Date: Mon, 30 Dec 1996 11:52:22 -0600 (CST)
To: ss@tapr.org
Message-ID: <199612301752.LAA29368@admin.inetport.com>
Rendered body type: text/plain

Phil and Greg conversed:

>Phil,

>
>Someone said the other day that FHSS have no process gain. Is this a
>correct statement ? I had thought that FHSS and DSSS both had process gain.
>
>Did I miss something ?
>
>Cheers - Greg
>
>
>>Remember also if you're going to compare the sensitivities of different
>>radios you also have to allow for the different data rates. It's not fair
>>to say that radio A is 30 dB "better" then radio B if radio B runs at
>>1000x the data rate...
>>
>>Phil

Lemme see if I can take a stab at a few things, mostly quoting from
textbooks, rather than my limited SS knowledge;

They both have process gain. Presumably if the hopping rate of an FH
system were to somehow approach the chip rate of a DS system, they would
approach each other in behavior. That isn't likely to happen
tomorrow (although the way technology races along I get nervous
making such predictions). Conventional thinking says that for DS the
chiprate is much greater than the datarate, while for FH the datarate is
(much) greater than the hopping rate.

A FH system is nothing more than a narrowband system that is moving
around, mostly hiding its presence and dodging QRM. As far as I am
aware, they both have process gain calculated by the same general
formula of how much space they spread a datarate over. Note that I am
referring to a 173 kb system as "narrowband" - that's pretty wide,
and I suspect that is why it hides itself pretty well on the frequency,
aside from hopping.

A DS system could, and some routinely do, have sufficient process gain
to recover a signal that is weaker than the thermal noise figure of it's
front end would permit a narrowband signal from recovering. The GPS
system is a case in point. Quoting from a textbook (Spread Spectrum
systems with commercial applications, 3rd ed, Robert Dixon, 1994,
John Wiley, TK5102.5.D55, pp370-371 and an excellent reference) the
author says that GPS is speced to deliver -135 dBm at the earth's surface.
(About 0.035 uV) For 9 MHz bandwidth, receiver thermal noise is -104 dBm.
The receivers routinely operate at -30 dB SNR. Answer: 10.23 Mcps rate,
9.0 MHz BW, and only 50 bps datarate, which yields 10*log(9.0E06/50)=
52.5 dB process gain. Inputting SNR of -30 db, and using the process
gain yields a positive SNR at the IF of 22 dB, and they work. But note
the datarate, 50 bps. Fine for positioning, but not to surf the web.

FH radios just DON'T do this. They have to have a positive SNR at their
inputs. Any hop where it goes negative will yield garbage on that hop,
and in fact determines the BER. I think that their value to us is
that they avoid QRM and to function at all, have to have error correcting
coding built in. I think that I could (over)generalize by saying that
DS systems are useful to work in the presence of broad gaussian noise
or what we like to refer to as QRN (impulse noise possibly excepted),
and that FH systems are useful to avoid QRM either from narrowband
sources or from other FH units on different codes. Their process gain
operates in a way to allow lots of them to spread out over a given band
and avoid each other, and avoid some fixed freq narrowband stations,
and also avoid any significant interference from themselves to narrow
systems by virtue of their extremely low keyup time on any particular
hop channel. My impression of the Freewave radios in particular is that
they have mixed a high on-air datarate (the 173 kb) with a hopping pattern
that spends very little time on the air at any channel, and there are
lots of channels in its pattern, so when the radio does happen to transmit
on a particular channel that another narrowband user is listening to,
the burst of data is both short AND WIDE, and the narrowband listener
just doesn't hear it. This is borne out by my listening to it at VERY
short range with a narrowband service analyzer, I just can't copy it
unless I turn on its continuous PTT test function unless I am within
a few feet of it. Similar to Greg's comment about the phone nearby.

Process gain for a FH system says something about how well we can pack
lots of data from lots of users in a given chunk of band allocation,
compared to how well the same space could be allocated by traditional
techniques of assigning individual narrowband channels. We let the
hopping algorithm allocate it instead of the frequency coordinator,

and efficiently pack more in the band. I think we also get a little
bit of additional re-use in that the SS radios can probably share the
band with some population of narrowband intermittent (PTT or packet)
stations, and not bother each other too much.

I can only hope the above may help to improve some of our understandings
of SS, I am in quite a bit over my head here. The above textbook
is an excellent reference, I can highly recommend it. I got to check it
out for an extended time over the holidays, and soemone else has already
recalled it, its in demand. This book does actually discuss some of the
things that go on in the 902-928 ISM band, among others, although it
slightly predates the Freewave radio. It did somewhat contradict the
advantages of the performance of the FH freewave radio, and I am almost
beginning to wonder if the Freewave might actually be a little bit of
a DS hybrid, possibly not pure FH? I don't think we have gotten a
close look at what actually goes on in that radio. It appears that
they have done their homework though.

73, and a prosperous new year to all, de Bob WB5AOH
Robert Morgan
Austin Texas
morganb@admin.inetport.com

162. Re: multiple FreeWaves at one site

From: "Robert A. Buaas" <buaas@wireless.net>
Date: Mon, 30 Dec 1996 10:52:42 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612301852.KAA06134@wireless.net>
Rendered body type: text/plain

In [SS:736] "Greg Jones, WD5IVD" <wd5ivd@tapr.org> wrote:

>I have two Freewave radios setting back to back right now -- one using a
>vert and the other horz beam (all the antennas I had around for the test).
>They are operating on two different channels (i.e. hop sequences) and
>feeding the serial connections between them.

>While many radios might not work transmitting next to each other, the
>Freewaves on different hop channels certainly do -- at least the pairs I
>have going here.

In [SS:740] Dewayne Hendricks <dewayne@warpspeed.com> wrote:

>I can confirm this. I recently helped the FreeWave people setup a
>radio link to their local ISP from their Boulder facility. I setup a PC
>running NOS and have five radios connected to it at 115 Kbps. One of the
>radios is a pt-pt link to the ISP, and the other four radios are pt-pt
>links to their employees homes. All of the radios operate on different
>hopping patterns and although their respective antennas are in quite close
>proximity they don't interfer with each other.

It strikes me that we could do everyone a service by conducting this
more scientifically, and determine exactly how well it works:

Greg: (since you have exactly two radios, back to back) would you
do the following:
 (a) with one link disabled, run enough FTP's over the working link
     to determine its best throughput, and document the number for us.
 (b) re-enable the downed link, connect it back-to-back with the
     first link, and rerun the FTP's over the 2-hop path, and document
     that result(s).

By pushing the two-link system really hard, you'll eventually force
one transmitter at the center of the system to be active at exactly
the same time the other receiver is expecting data, and we'd expect
to statistically measure the impact. FreeWaves transmit in short
bursts, leaving large windows for receiving (yet the receiver logic
is only powered-up for short periods of time inside these windows).

Since these radios have a repeater mode of sorts, having the
results from the test above would tell us how much we get in
return for having the second radio, antenna, etc.

best regards/bob K6KGS

163. Re: [SS:744] Re: multiple FreeWaves at one site

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Mon, 30 Dec 1996 15:11:35 -0600
To: ss@tapr.org
Message-ID: <v0300782aaeeddffa02a9@[129.120.111.42]>
Rendered body type: text/plain

>Greg: (since you have exactly two radios, back to back) would you
>do the following:
> (a) with one link disabled, run enough FTP's over the working link
>   to determine its best throughput, and document the number for us.
> (b) re-enable the downed link, connect it back-to-back with the
>   first link, and rerun the FTP's over the 2-hop path, and document
>   that result(s).
>

I already did this. The results were no difference. I could see no drop
off in throughput wioth a single point or running through the pair. Since
I was testing while downloading several megs of files from the TAPR.ORG
system for the upcoming '97 CD-ROM I am sure there should have been
considerable overlap.

>Since these radios have a repeater mode of sorts, having the
>results from the test above would tell us how much we get in
>return for having the second radio, antenna, etc.

I haven't played with the repeater function and will probably leave that to
the others getting radios in the middle of January. Can't do everything.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

164. Re: [SS:718] Re: SS digest 197

From: "Dan Hoyer" <dhoyer@ccm.frontiercorp.com>
Date: Mon, 30 Dec 96 14:52:05 EST
To: ss@tapr.org
Message-ID: <9611308519.AA851990274@ccm.frontiercorp.com>
Rendered body type: text/plain

>> Date: Fri, 27 Dec 1996 18:40:49 -0600
>> From: "Greg Jones, WD5IVD"
><wd5ivd@tapr.org> > To: ss@tapr.org
>> Subject: Re: ss
>> Message-ID:
><v0300781daeea19cd9285@[129.120.111.42]> >
>>
>> that gets more SS radios into the amateur service. There are people
>> already using WaveLan and I hope that in the long term TAPR or some other
>> amateur will be able produce some radio that does what amateur radio
>needs, > not just a commercial version convertered or operated under Part
>97.

>What is the advantage of this 115kbps SS radio, when the WaveLAN
>does 2Mbps, and costs about the same (US$ 400)?
>The WaveLan also has
>DOS, Linux, and NT drivers. The 900MHz WaveLan has 7dBm less power
>though.

Hmmm, that's a good question about the advantages. As I see it here are some
major advantages:

Unlike the WaveLan that is a board installed in the computer, (unless you use
the OEM WaveMODEM version of the WaveLAN hardware) the FreeWave radio operates
as an RS232 full duplex async link transparently to the end devices connected to
it, therefore it does not need special drivers. This makes it a good choice for
-any- computing platform. (or even a back to back link with something like an
ISDN landline)

Also according to the specs it has an AT command set mode available making it
look like a Hayes type modem device. This mode would be useful for an
environment that does not directly support direct-connect async, but instead
supports modems.

dhoyer@frontiercorp.com
ka9vmi

>--
>BogoMIPS Research Labs -- bogosity research & simulation -- VE7JPM --
  >jmorriso@bogomips.com ve7jpm@ve7jpm.ampr.org jmorriso@ve7ubc.ampr.org
>--

165. Re: [SS:743] Re: avoiding interference with narrowband sources

From: wpns@world.std.com (William Smith)
Date: Mon, 30 Dec 1996 16:42:02 -0500 (EST)
To: ss@tapr.org
Message-ID: <199612302142.AA26536@world.std.com>
Rendered body type: text/plain

There's been some discussion of avoiding QRM with/to narrowband
sources, anyone doing anything in the Boston area that would like to
check out the mutual performance/interference characteristics of a SS
system at 915 MHz with a low-power FMTV setup centered at 915.00?

--
Willie Smith wpns@world.std.com N1JBJ@amsat.org
#define NII Information SuperCollider

166. Re: [SS:743] Re: .. Process Gain

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 30 Dec 96 16:15:31 UTC
To: ss@tapr.org
Message-ID: <11830@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Bob and Greg,

    While talking to Mel Whitten on the phone, he said that the Freewaves
are hopping at 10 ms. Mel came down to visit u at a TPRS meeting to check
out the radios.

    I was then talking to Don Lemley, on a repeater, and we were going over
the FH and FEC, and how FEC is an integral part of FH-SS that has process
gain. If a hit happens, a FH-SS system with process gain will just recover
the bits with its FEC. As long as the FEC isn t overpowered, the FH-SS system
will have a process gain equal to # of full bandwidth channels in the hopped
spectrum devided. □□□□That is, some FH-SS systems do not hop a full bandwidth.

    At 173 Kbps, 10 ms is bigger than many packets. 10 ms being 1.73 KBits.
So, Don made the conjecture, which I could not refute, that the radios may
just be doing ARQ, instead of FEC and ARQ. In which case, I m pointing out
that these radios would have no process gain. But, it really doesn t matter,
since the noise performance of the radios is set by the thermal effects in
most cases. Since, the spread spectrum is so large, and the usership so small
that the C/I is very big. And the probability of a hit is less than the ther-
mally set BER would cause. And if theres a hit, the radios just ARQ.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

167. Re: [SS:747] Re: avoiding interference with narrowband sources

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 30 Dec 96 16:30:09 UTC
To: ss@tapr.org
Message-ID: <11833@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Willie,

   I would suggest, if the 915 FMTV system isn t seeing interferance now,
they are not going to see interferance when the TAPR STA guys come on the air.

   I had a IFR 1200 S Service Monitor / Spectrum Analyzer looking at the
signal on that band, thru one of the Ham/LAN Panel 915 antennas the other day,
and there s plenty of FH activity here in Chicagoland. I can t believe the
same is not true in Boston. That is NON-HAM FH activty!

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

168. Freewave SS LAN (fwd)

From: Barry McLarnon VE3JF <bm@hydra.carleton.ca>
Date: Mon, 30 Dec 1996 19:17:30 -0500 (EST)
To: ss@tapr.org
Message-ID: <199612310017.TAA22866@hydra.carleton.ca>
Rendered body type: text/plain

This message got snagged by a listserver bug, so I'm forwarding it...

-Barry

Forwarded message:
> From ss@tapr.org Mon Dec 30 03:22:38 1996
> From: ss@tapr.org
> Date: Mon, 30 Dec 1996 02:23:42 -0600 (CST)
> Message-Id: <199612300819.DAA13524@mailnfs0.tiac.net>
> Reply-To: ss@tapr.org
> Originator: ss@tapr.org
> Sender: ss@tapr.org
> Precedence: bulk
> To: bm@hydra.carleton.ca
> Subject: [SS:739] Notification: message ignored
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: Tucson Amateur Packet Radio Spread Spectrum
> Content-Transfer-Encoding: 7bit
> Content-Type: text/plain; charset="us-ascii"
> MIME-Version: 1.0
> X-Mailer: James Archer's Registered PMMail 1.53 For OS/2
>
> Found X-Listprocessor-Version: id in message body; message ignored
>
> The message is included below:
> ---
> >From jarcher@tiac.net Mon Dec 30 02:20:23 1996
> Received: from maildeliver0.tiac.net (maildeliver0.tiac.net [199.0.65.19]) by tapr.org
(8.7.5/8.7.3/1.9) with ESMTP id CAA20835 for <ss@tapr.org>; Mon, 30 Dec 1996 02:20:21 -0600 (CST)
> Received: from mailnfs0.tiac.net (mailnfs0.tiac.net [199.0.65.17]) by maildeliver0.tiac.net
(8.8.0/8.8) with ESMTP id DAA14814; Mon, 30 Dec 1996 03:20:02 -0500 (EST)
> Received: from localhost.tiac.net (jarcher.tiac.net [206.119.13.90]) by mailnfs0.tiac.net (8.8.0/8.8)
with SMTP id DAA13524; Mon, 30 Dec 1996 03:19:59 -0500 (EST)
> Message-Id: <199612300819.DAA13524@mailnfs0.tiac.net>
> From: "Jim Archer" <jarcher@tiac.net>
> To: "ss@tapr.org" <ss@tapr.org>
> Date: Mon, 30 Dec 96 03:18:44 -0400
> Reply-To: "Jim Archer" <jarcher@tiac.net>
> Priority: Normal
> X-Mailer: James Archer's Registered PMMail 1.53 For OS/2
> MIME-Version: 1.0
> Content-Type: text/plain; charset="us-ascii"
> Content-Transfer-Encoding: 7bit
> Subject: Freewave SS LAN
>
> -----BEGIN PGP SIGNED MESSAGE-----
>
> Hi All...
>
> I apolagize if sime of these questions are old or simple, but
> I'm a bit new to spread spectrum.
>
> I read a note about the Freewave SS radios, and got the idea to
> get together with a bunch of my friends and deploy a radio LAN
> with them. I was discussing it tonight with them, and we thought
> up some questions we could not answer. I would appreciate any
> help or advice someone can offer. I am sorry if this is too much
> to ask in one fell swoop...
>
> Technical Questions:
>
> We would initially have about 4 sites, some of which would be
> hidden transmitters from each other. Also, the distances
> involved may exceed 10 air miles, so directonal antennas may be
> required. How do we do this? Do we put up a site in the middle
> with a PC and a radio and make it digipeat? If we did that,

> would it cut our throughput in half, or would a protocol like
> TCP with an adjustable window size reduce this problem?
>
> If we can modify our serial ports to exceed 115K, can we use the
> full 127K baud rate that the Freewave radio can supply, or is
> the serial port on the radio limited to 115k? Does the radio
> even plug into the computer via a serial port?
>
> What other things are needed than the radio and other stuff
> included by TAPR? I saw that they supply the radio, case, power
> cube, and whip antenna. Is there any big expensive piece
> missing?
>
> Are any software drivers available to make this think look like
> a network adapter available? We are running Linux and OS/2, but
> some people may want to run Win 95 or NT. We are all
> professional software developers with experience doing drivers,
> so we could write them, but I am wondering if they are done yet.
>
> What frequency is legal for ham operation, and how do we make
> these radios do it? I saw that no modifications were made to the
> radios, so I guess they must be coming on the right frequency.
> Was this a special arrangement with the manufacturer?
>
> If a number of transmitters were transmitting on different
> hopping algorathims, could we build a receiver that used DSP
> technology to receive them all at the same time? Do the radios
> transmit and receive on different frequencies? Can the radios
> use different physical frequency bands, so that several if one
> freq band is operating at capacity, we could use another, and
> tie the two together with some kind of routing software?
>
> Legal Questions:
>
> How do we use the Freewave radios under part 15? If we wanted to
> use them under part 15, would we have to not use gain antennas,
> or would we have ti use less than 1 watt out of the radio? Does
> part 15 limit ERP or power out of the radio? Power into the
> antenna maybe? Are their other provisions of part 15 that would
> make this illegal, like a restriction of distance we can
> transmit?
>
>
>
> Thanks again to everyone who tolerated all these questions!!!
>
> Jim, KF1T
>
> **
> * PGP Key available from: www.tiac.net/users/jarcher
> *
> * Fingerprint:
> * 56 BA 7B 48 22 5C 1D BD CB 15 F2 AC B3 32 24 A8
> **
>
>
>
> -----BEGIN PGP SIGNATURE-----
> Version: 2.6.2
>
> iQCVAwUBMsd7KuM94M/jnRzVAQGTrQP/ZncRJtX7Enpg2bOHEb8IWfBSoFpokzbz
> stzG9OlGXe11I9lJuXllm0AQ/AW7OAlIfNRN3aYL7SO7cNn+UzzsD8rC2nKOCT1N
> unDH2b18R9Ulh2b6/Hmc4SBfVe8YBX902Ucy0n4hj4Ch77zEY8YMU+XbMXsHYqza
> et27qqZyuOY=
> =0kcd
> -----END PGP SIGNATURE-----
>

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

169. Re: [SS:748] Re: .. Process Gain

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Tue, 31 Dec 1996 01:05:00 +0000 (GMT)
To: ss@tapr.org

Message-ID: <199612310105.BAA14115@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Don said:

>   Been looking at ur numbers, and can t see where u went wrong with the
>Freewave figuring. The only guess would be that they are using coherent
>GFSK, and that might result in a better Eb/N0 to start with.

Possible, but unlikely... coherent demodulation is quite difficult to
implement in an FH system.

And in a later message:

>   While talking to Mel Whitten on the phone, he said that the Freewaves
> are hopping at 10 ms. Mel came down to visit u at a TPRS meeting to check
> out the radios.
>
>   I was then talking to Don Lemley, on a repeater, and we were going over
> the FH and FEC, and how FEC is an integral part of FH-SS that has process
> gain. If a hit happens, a FH-SS system with process gain will just recover
> the bits with its FEC. As long as the FEC isn t overpowered, the FH-SS system
> will have a process gain equal to # of full bandwidth channels in the hopped
> spectrum devided. □□□□That is, some FH-SS systems do not hop a full bandwidth.
>
>   At 173 Kbps, 10 ms is bigger than many packets. 10 ms being 1.73 KBits.
> So, Don made the conjecture, which I could not refute, that the radios may
> just be doing ARQ, instead of FEC and ARQ. In which case, I m pointing out
> that these radios would have no process gain. But, it really doesn t matter,
> since the noise performance of the radios is set by the thermal effects in
> most cases. Since, the spread spectrum is so large, and the usership so small
> that the C/I is very big. And the probability of a hit is less than the ther-
> mally set BER would cause. And if theres a hit, the radios just ARQ.

Hmmm... are you confusing "coding gain" with "process[ing] gain"? The
process gain, for either DS or FH, is essentially the bandwidth
expansion factor. This is a separate issue from whether FEC is
implemented - with or without it, the FreeWave radios definitely have
process gain (admittedly, the concepts of process gain, coding gain and
diversity gain tend to blur together, especially in the case of DS and
fast-FH). In any event, I suspect that Don L is correct in supposing
that the FreeWaves do not use FEC, although FEC would offer a possible
explanation for my earlier "too good to be true" BER analysis.

Barry

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

170. Re: [SS:750] Freewave SS LAN (fwd)

From: "Greg Jones, WD5IVD" <wd5ivd@tapr.org>
Date: Mon, 30 Dec 1996 20:14:43 -0600
To: ss@tapr.org
Message-ID: <v03007841aeee22b3b90e@[129.120.111.42]>
Rendered body type: text/plain

>> Technical Questions:
>>
>> We would initially have about 4 sites, some of which would be
>> hidden transmitters from each other. Also, the distances
>> involved may exceed 10 air miles, so directonal antennas may be
>> required. How do we do this? Do we put up a site in the middle
>> with a PC and a radio and make it digipeat? If we did that,
>> would it cut our throughput in half, or would a protocol like
>> TCP with an adjustable window size reduce this problem?

I would highly suggest you do all point-to-point connections on any
backbone links. All connections between these major sites would be on
individual channels. This increases the cost of links, but we have to
think about designing good links instead of cutting costs and operational
throghput

I would highly suggest you use beams on all your point to point links. Horz.

We plan on running TCP/IP across both the networks I am working on both in
Dallas/Denton and Austin. Very easy to run WinSock or MacSlip on either
Mac or Windows platforms into the nodes (which will be Linux based router
-- hopefully running off of 4Meg Flash only -- Allan Finne is working on

that now). These local access channels would then run off a horz omni of
some design (possibly a slot, which Bob Morgan is developing). Based on
rough calc using the radios in point-to-multipoint, figure to try to limit
no more than 5 or 6 users per local access channel. This will allow best
throughput overall.

>> If we can modify our serial ports to exceed 115K, can we use the
>> full 127K baud rate that the Freewave radio can supply, or is
>> the serial port on the radio limited to 115k? Does the radio
>> even plug into the computer via a serial port?

Hard to say. The radios run at 173Kbaud. I don't think anyone has tried
it yet, so we don't know what the outcome might be in either point-to-point
or point-to-multi. We do know that having 16550A or BETTER are very
important to making it work at high speed.

>> What other things are needed than the radio and other stuff
>> included by TAPR? I saw that they supply the radio, case, power
>> cube, and whip antenna. Is there any big expensive piece
>> missing?

No snub antenna. You are looking at all the normal stuff for a site.
After years of building networks site, and these seem to be no different,
you should expect to drop at least $1000 dollars per major network node
site. Beams, feedline, power (btty?, UPS?, your choice), switch
(386,486,other?), etc.

>> Are any software drivers available to make this think look like
>> a network adapter available? We are running Linux and OS/2, but
>> some people may want to run Win 95 or NT. We are all
>> professional software developers with experience doing drivers,
>> so we could write them, but I am wondering if they are done yet.

As above, simply run SLIP across the links. Then you can use existing
stacks to do communications. This e-mail is being typed in Eudora on my
Mac which will shortly connect across a pair of Freewave radios over 4
miles. My mac is using an older version of MacTCP (becuase OTP doesn't
work yet for direct connection) and MacSLIP. Over on the PC

>> What frequency is legal for ham operation, and how do we make
>> these radios do it? I saw that no modifications were made to the
>> radios, so I guess they must be coming on the right frequency.
>> Was this a special arrangement with the manufacturer?

They operate across the ham band 902-928. Perfect legal under the TAPR SS
STA for operations. You will have to meet the STA requirements to operate
them.

>> If a number of transmitters were transmitting on different
>> hopping algorathims, could we build a receiver that used DSP
>> technology to receive them all at the same time? Do the radios
>> transmit and receive on different frequencies? Can the radios
>> use different physical frequency bands, so that several if one
>> freq band is operating at capacity, we could use another, and
>> tie the two together with some kind of routing software?

I'll leave that up to someone in the know. Anything is possible, but the
question is, is there a DSP(s) that will do it and could you afford them.

Cheers - Greg

Greg Jones, WD5IVD
Austin, Texas
wd5ivd@tapr.org
http://www.tapr.org/~wd5ivd
-----

171. Re: [SS:743] Re: .. Process Gain

From: Dave Koberstein <davek@komacke.com>
Date: Mon, 30 Dec 1996 18:59:16 -0800
To: ss@tapr.org
Message-ID: <3.0.1.32.19961230185913.006b45e4@sydney>
Rendered body type: text/plain

Hi All,

Good discussion by Robert below but I'd like to change a conclusion. FH
radios operate just as well as DS radios in the presence of gaussian noise.
 The point left out in the discussion below is that the FH radio uses a
receiver bandwidth the width of the narrowband-modulated signal. A DS
radio uses a receiver bandwidth "n" times wider and so receives "n" times
as much noise power.

Since a DS radio needs a much wider receiver bandwidth, it receives much
more noise. However, it processes out the additional noise by unspreading
the signal. In fact, all things being equal, a DS signal has no advantage
against broadband or thermal noise compared to a non-SS signal. The non-SS
signal can use correspondingly narrow receiver bandwidths and therefore
have correspondingly less thermal noise power to degrade S/N.

The advantage of DS and FH is resistance to relatively narrowband
interferors or relatively narrowband power loss (i.e. multipath). They
don't resist wideband thermal noise. To quote out of context: to do so
would violate the laws of physics. (Really, it would violate our current
understanding of information theory.)

At 11:52 AM 12/30/96 -0600, you wrote:
>A DS system could, and some routinely do, have sufficient process gain
>to recover a signal that is weaker than the thermal noise figure of it's
>front end would permit a narrowband signal from recovering. The GPS
>system is a case in point. Quoting from a textbook (Spread Spectrum
>systems with commercial applications, 3rd ed, Robert Dixon, 1994,
>John Wiley, TK5102.5.D55, pp370-371 and an excellent reference) the
>author says that GPS is speced to deliver -135 dBm at the earth's surface.
>(About 0.035 uV) For 9 MHz bandwidth, receiver thermal noise is -104 dBm.
>The receivers routinely operate at -30 dB SNR. Answer: 10.23 Mcps rate,
>9.0 MHz BW, and only 50 bps datarate, which yields 10*log(9.0E06/50)=
>52.5 dB process gain. Inputting SNR of -30 db, and using the process
>gain yields a positive SNR at the IF of 22 dB, and they work. But note
>the datarate, 50 bps. Fine for positioning, but not to surf the web.

>
>FH radios just DON'T do this. They have to have a positive SNR at their
>inputs. Any hop where it goes negative will yield garbage on that hop,
>and in fact determines the BER. I think that their value to us is
>that they avoid QRM and to function at all, have to have error correcting
>coding built in. I think that I could (over)generalize by saying that
>DS systems are useful to work in the presence of broad gaussian noise
>or what we like to refer to as QRN (impulse noise possibly excepted),
>and that FH systems are useful to avoid QRM either from narrowband
>sources or from other FH units on different codes. Their process gain
>operates in a way to allow lots of them to spread out over a given band
>and avoid each other, and avoid some fixed freq narrowband stations,
>and also avoid any significant interference from themselves to narrow
>systems by virtue of their extremely low keyup time on any particular
>hop channel. My impression of the Freewave radios in particular is that
>they have mixed a high on-air datarate (the 173 kb) with a hopping pattern
>that spends very little time on the air at any channel, and there are
>lots of channels in its pattern, so when the radio does happen to transmit
>on a particular channel that another narrowband user is listening to,
>the burst of data is both short AND WIDE, and the narrowband listener
>just doesn't hear it. This is borne out by my listening to it at VERY
>short range with a narrowband service analyzer, I just can't copy it
>unless I turn on its continuous PTT test function unless I am within
>a few feet of it. Similar to Greg's comment about the phone nearby.
>
>Process gain for a FH system says something about how well we can pack
>lots of data from lots of users in a given chunk of band allocation,
>compared to how well the same space could be allocated by traditional
>techniques of assigning individual narrowband channels. We let the
>hopping algorithm allocate it instead of the frequency coordinator,
>and efficiently pack more in the band. I think we also get a little
>bit of additional re-use in that the SS radios can probably share the
>band with some population of narrowband intermittent (PTT or packet)
>stations, and not bother each other too much.
> -------------------- End of Original ---------------------------------

____
Dave Koberstein
  work: davek@proxim.com / http://www.proxim.com
  keep in touch: davek@komacke.com / http://www.komacke.com
  ham internet: n9dk@n9dk.ampr.org [44.4.12.172]
   (ax.25/PBBS: n9dk@w6yx.#nocal.ca.usa.noam)

172. Re: [SS:751] Re: .. Process Gain

From: wb9mjn@wb9mjn.ampr.org
Date: Mon, 30 Dec 96 21:02:46 UTC
To: ss@tapr.org
Message-ID: <11840@wb9mjn.ampr.org>
Rendered body type: text/plain

Hi Barry,

  I probably am confusing coding and process gains. But a FH system without
FEC will have interferance, no matter what the bandwidth expansion factor,
so can it be claimed to have any process gain? Since interfering signals
do not require any gain over the FH signal, to cause interferance.

  I had forgot about the coherent difficulties in a FH system. That is pointed
out in the Dixon book.

  BTW, I m a Don L, too, hi.

73, Don.

Mailbox : WB9MJN @ N9HSI.IL.USA.NA
AMPRNet : wb9mjn@wb9mjn.ampr.org[44.72.98.19]
Internet: wb9mjn%wb9mjn.ampr.org@uugate.aim.utah.edu

173. Re: [SS:734] Re: ..

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 02:21:19 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612311021.CAA16144@servo.qualcomm.com>
Rendered body type: text/plain

It seems to me that your BER-vs-dBm measurements are rather
meaningless without some way to tell whether you're being limited by
demodulator performance or front-end performance. Front end
performance from unit to unit can easily vary by many more dB than
demodulator performance, especially if everybody uses the same simple
noncoherent demodulators without any FEC.

The distinction is important because it's relatively easy to
compensate for a noisy front end in a Part 15 unit by adding an
external preamp, but there's little you can do to compensate for an
inefficient demodulator given that these devices are closed black
boxes. (Perhaps some external FEC would help, but not if the packet
and bit synchronization mechanisms are already marginal to begin with,
or if there are built-in packet level CRCs that can't be disabled).

The only way to tell is with a Eb/N0 test set that amplifies the input
signal and adds a controlled amount of wideband noise that swamps the
noise contributed by the receiver front end. Then you can get a
measurement of the demodulator's performance independent of the front
end noise figure.

There are commercial test sets designed specifically for these
measurements; I have one by Scientific Atlanta sitting in my
office. (Unfortunately it only works at a 70MHz IF, which makes it
inconvenient for anything that doesn't have a 70MHz IF). If you have a
wideband noise source, a spectrum analyzer, some RF gain blocks and a
hybrid combiner, you can come up with a pretty good replacement of
what this test set does.

I'd be very interested in any quantitative results if anybody tries this.

Phil

174. Re: [SS:738] RE: 731] Re: ..

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 02:42:04 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612311042.CAA16203@servo.qualcomm.com>
Rendered body type: text/plain

Where can I find some info that relates S/N required for a specific BER?
        In the fiber optic systems I work with we assume 10.9dB for a BER 1e-9 but
        I dont know what to assume for different BERs.

This depends on the modulation method, FEC (if any) and the optimality
of the implementation. Not only can different modems require different Eb/N0s

for a given BER, but the slope of those curves can vary dramatically (particularly with FEC).

So it is hard to give any hard and fast answers, especially given the "black box" nature of these modems. The best I can suggest is that comparative measurements be made at comparable BERs.

Phil

175. Re: [SS:742] Re: ..

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 02:50:27 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612311050.CAA16214@servo.qualcomm.com>
Rendered body type: text/plain

>Someone said the other day that FHSS have no process gain. Is this a
>correct statement ? I had thought that FHSS and DSSS both had process gain.

Sure FHSS has process gain. It's just the number of hopping channels. The nature of the interference is different than DSSS (it comes in occasional strong bursts rather than as a continuous thermal-like background) but that can actually be an advantage if good burst-error-correcting FEC is used.

Phil

176. Re: [SS:743] Re: .. Process Gain

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 03:53:22 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612311153.DAA16314@servo.qualcomm.com>
Rendered body type: text/plain

An additional comment on Bob Morgan's good discussion of process gain:

The reason FH radios generally hop slower than their data rate is not a limitation of the technology. With direct digital synthesizers (DDSes) there is no real limit to how fast you can hop.

The limit comes from the inability, in most real-world frequency hopping environments, to maintain carrier phase coherence across a hop. The medium is often dispersive, i.e., it has a propagation delay that depends on frequency, so even with accurate frequency references at both ends there is a random and unpredictable phase jump across the hop. So if the hop is shorter than its symbol time, the symbol energy that is spread out over multiple hops must be recombined noncoherently, and this is less efficient than coherent combining.

Note that this applies even to "noncoherent" modulation methods like FSK and DPSK. They're "noncoherent" only in not requiring the receiver to estimate carrier phase over some largish number of symbol intervals; the receiver still performs a coherent integration over each individual symbol time.

Direct sequence doesn't have this problem. You can coherently integrate in direct sequence over as many PN chips as you like, up to the coherence time limit of the channel (which is the inverse of the doppler spread, which in turn depends on how fast the stations and/or the propagation medium is moving with respect to one another).

Phil

177. Re: [SS:753] Re: .. Process Gain

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 04:09:37 -0800 (PST)
To: ss@tapr.org
Message-ID: <199612311209.EAA16338@servo.qualcomm.com>
Rendered body type: text/plain

>The advantage of DS and FH is resistance to relatively narrowband
>interferors or relatively narrowband power loss (i.e. multipath). They
>don't resist wideband thermal noise. To quote out of context: to do so
>would violate the laws of physics. (Really, it would violate our current
>understanding of information theory.)

Unless you consider FEC to be a form of spread spectrum, in which case going wider *does* help you against wideband thermal noise. I know, the usual definition of spread spectrum doesn't include FEC, but I

argue that they do look very much alike. In fact, DSSS can be seen as
a special case of coding with a low-rate random code that has no
gain as compared to a code chosen for good distance properties.

Phil

178. Another bounced message...

From: Barry McLarnon VE3JF <bm@lynx.ve3jf.ampr.org>
Date: Tue, 31 Dec 1996 14:30:25 +0000 (GMT)
To: ss@tapr.org
Message-ID: <199612311430.OAA18314@lynx.ve3jf.ampr.org>
Rendered body type: text/plain

Here's another message from Jim Archer... unfortunately, there is a bug
in Listproc which causes it to reject PGP-encoded messages (it thinks
they are bounced list mail). Fixing it involves rebuilding Listproc
from the sources... Lee (keeper of the TAPR server) will have to do
that. In the meantime, the only workaround is to not use PGP in mail to
the list.

-Barry

Forwarded message:
> From ss@tapr.org Tue Dec 31 04:53:10 1996
> From: ss@tapr.org
> Date: Mon, 30 Dec 1996 22:55:47 -0600 (CST)
> Message-Id: <199612310450.XAA13167@mailnfs0.tiac.net>
> Reply-To: ss@tapr.org
> Originator: ss@tapr.org
> Sender: ss@tapr.org
> Precedence: bulk
> To: bm@hydra.carleton.ca
> Subject: [SS:754] Notification: message ignored
> X-Listprocessor-Version: 6.0 -- ListProcessor by Anastasios Kotsikonas
> X-Comment: Tucson Amateur Packet Radio Spread Spectrum
> Content-Transfer-Encoding: 7bit
> Content-Type: text/plain; charset="us-ascii"
> MIME-Version: 1.0
> X-Mailer: James Archer's Registered PMMail 1.53 For OS/2
>
> Found X-Listprocessor-Version: id in message body; message ignored
>
> The message is included below:
> ---
> >From jarcher@tiac.net Mon Dec 30 22:51:05 1996
> Received: from maildeliver0.tiac.net (maildeliver0.tiac.net [199.0.65.19]) by tapr.org
(8.7.5/8.7.3/1.9) with ESMTP id WAA25163 for <ss@tapr.org>; Mon, 30 Dec 1996 22:51:03 -0600 (CST)
> Received: from mailnfs0.tiac.net (mailnfs0.tiac.net [199.0.65.17]) by maildeliver0.tiac.net
(8.8.0/8.8) with ESMTP id XAA08734; Mon, 30 Dec 1996 23:50:53 -0500 (EST)
> Received: from localhost.tiac.net (jarcher.tiac.net [206.119.13.90]) by mailnfs0.tiac.net (8.8.0/8.8)
with SMTP id XAA13167; Mon, 30 Dec 1996 23:50:49 -0500 (EST)
> Message-Id: <199612310450.XAA13167@mailnfs0.tiac.net>
> From: "Jim Archer" <jarcher@tiac.net>
> To: "ss@tapr.org" <ss@tapr.org>
> Date: Mon, 30 Dec 96 23:50:46 -0400
> Reply-To: "Jim Archer" <jarcher@tiac.net>
> Priority: Normal
> X-Mailer: James Archer's Registered PMMail 1.53 For OS/2
> MIME-Version: 1.0
> Content-Type: text/plain; charset="us-ascii"
> Content-Transfer-Encoding: 7bit
> Subject: Re: [SS:752] Re: Freewave SS LAN (fwd)
>
> -----BEGIN PGP SIGNED MESSAGE-----
>
> On Mon, 30 Dec 1996 20:18:39 -0600 (CST), Greg Jones, WD5IVD
> wrote:
>
> Thanks, Greg... But you lost me on a few things...
>
>
> >>> We would initially have about 4 sites, some of which would be
> >>> hidden transmitters from each other. Also, the distances
> >>> involved may exceed 10 air miles, so directonal antennas may be
> >>> required. How do we do this? Do we put up a site in the middle
> >>> with a PC and a radio and make it digipeat? If we did that,
> >>> would it cut our throughput in half, or would a protocol like
> >>> TCP with an adjustable window size reduce this problem?
> >

> >I would highly suggest you do all point-to-point connections on any
> >backbone links. All connections between these major sites would be on
> >individual channels. This increases the cost of links, but we have to
> >think about designing good links instead of cutting costs and operational
> >throghput
>
> Currently, we are planning just one major site, I guess,
> depending on what a major site is. If I were building a wired
> LAN, I would tie my servers together with some type of high
> speed backbone (and I have done this) and use something like
> 10BaseT or Token Ring from each server for its immediate users.
> Of course, each server would route, especially if they were
> Netware, but that gets off topic... Anyhow, this is all normal,
> but there is no hidden transmitter problem.
>
> When doing this by radio, how do we deal with the fact that all
> radios can't hear each other? Do we have to take advantage of
> geography to put a "server" in every vally, with each server
> handling local users on a different virtual channel (hopping
> scheme), and then tie all the servers together either by
> landline or a different radio virtual channel?
>
> I guess if we did this, we don't need to digipeat, except
> between the servers.
>
> >I would highly suggest you use beams on all your point to point links. Horz.
>
> OK.
>
> >rough calc using the radios in point-to-multipoint, figure to try to limit
> >no more than 5 or 6 users per local access channel. This will allow best
> >throughput overall.
>
> What defines a "local access channel?" Is this a different
> hopping algorathim on the same frequence band, or an actual
> different frequency band? Also, what kind of throughput should
> we expect?
>
>
> Thanks again for your help, Greg!
>
> Jim
>
> **
> * PGP Key available from: www.tiac.net/users/jarcher
> *
> * Fingerprint:
> * 56 BA 7B 48 22 5C 1D BD CB 15 F2 AC B3 32 24 A8
> **
>
>
>
> -----BEGIN PGP SIGNATURE-----
> Version: 2.6.2
>
> iQCVAwUBMsibquM94M/jnRzVAQFz7QP/UZMCNoARKS7s89egzYFpAhmLs8yc+8Ti
> ZqHCb5zJNvey/Eebm6RpDAg92SC1l8A6YbQwDw6i4aY1/BpWG6lfdQ8DwjXWxdtD
> JBxK9rR4epNsCmF56ozEZF/T4QuSYn/gbRj5Ao7PwRbtXTjchCxJbVBKfirqMJao
> OODF/t7UYjA=
> =HdpZ
> -----END PGP SIGNATURE-----
>

--
  Barry McLarnon VE3JF/VA3TCP | Internet: bm@hydra.carleton.ca
  Ottawa Amateur Radio Club | AMPRnet: bm@lynx.ve3jf.ampr.org
  Packet Working Group | Web: http://hydra.carleton.ca

179. Re: [SS:745] Re: multiple FreeWaves at one site

From: Bernie Doehner <bad@uhf.wireless.net>
Date: Tue, 31 Dec 1996 11:37:59 -0500 (EST)
To: ss@tapr.org
Message-ID: <Pine.BSF.3.95.961231112332.3603B-100000@uhf.wdc.net>
Rendered body type: text/plain

On Mon, 30 Dec 1996, Greg Jones, WD5IVD wrote:

>

> I already did this. The results were no difference. I could see no drop
> off in throughput wioth a single point or running through the pair. Since
> I was testing while downloading several megs of files from the TAPR.ORG
> system for the upcoming '97 CD-ROM I am sure there should have been
> considerable overlap.

Hold on a second.. Isn't your internet connection rate limiting your
download in this configuration (what is your ftp throughput, downloading
directly from TAPR.ORG to your Freewave gateway?)?

Could you please rerun your tests, but
this time download a file from one end point of your Freewave link to the
other (instead of fetching files from the internet)?

Thanks!

Bernie

180. Re: [SS:758] Re: .. Process Gain

From: Dirk Koopman <djk@tobit.co.uk>
Date: Tue, 31 Dec 1996 16:42:17 +0000 (GMT)
To: Phil Karn <karn@qualcomm.com>
Cc: ss@tapr.org
Message-ID: <Pine.LNX.3.95.961231163923.811A-100000@dirku.tobit.co.uk>
Rendered body type: text/plain

On Tue, 31 Dec 1996, Phil Karn wrote:

> An additional comment on Bob Morgan's good discussion of process gain:
>

<snip>

>
> Direct sequence doesn't have this problem. You can coherently
> integrate in direct sequence over as many PN chips as you like, up to
> the coherence time limit of the channel (which is the inverse of the
> doppler spread, which in turn depends on how fast the stations and/or
> the propagation medium is moving with respect to one another).

In real world situations with some of these 1Mb + DS systems what is the
likely doppler shift that these units can tolerate (very approximately)?

How (much) is it likely to increase the acquisition time?

Dirk

--
Dirk-Jan Koopman   Tel/Fax: +44 1362 696076 Mobile: +44 973 333806
Computer Consultant   Email: djk@tobit.co.uk or G1TLH@GB7TLH.#35.GBR.EU
"The typewriting machine, when played with expression, is no more annoying than
the piano when played by a sister or near relation." --Oscar Wilde

181. Re: Backbone

From: Steve Sampson <ssampson@oklahoma.net>
Date: Tue, 31 Dec 1996 10:40:36 -0600
To: ss@tapr.org
Message-ID: <32C94204.66C@oklahoma.net>
Rendered body type: text/plain

> Thanks, Greg... But you lost me on a few things...
>
> When doing this by radio, how do we deal with the fact that all
> radios can't hear each other?

What do you want to do?

1.   Do you want to create a backbone for a low-baud AX.25 network?
2.   Do you want to Network several workstations?

Extrapolate your usage. Down the road you will no doubt be running
multiple network connections to multiple servers/workstations. It's
hard to visualize a radio network in ethernet terms, as the radios
can't be in parallel. If you stick with a serial network, sooner or
later it will collapse, with the nodes in the middle doing all the
work.

Probably the best bet is to group the nodes that can hear each other
together, and select one as the server. Then this server will

connect to another server. There's no cut and dried book method.
The thing to keep in mind, is how the end points throughput is
tuned. If the end points must cycle through four servers to get
to each other, this may be the limiting bandwidth factor of the
network.

Short answer, limit the routers in any network, maximize the users
on a leg (within applications performance. For example, more than
five users on a leg using Microsoft Access, or Borland DBase would
be ludicrous). What that means in radio context, is to elect a
router, and have the cell use that to point to. In the worse-case
it will be three nodes. In the best-case, it will be 15 (the maximum
hopping channels). Sometimes "anything" is "something."

Steve

182. Re: [SS:759] Re: .. Process Gain

From: Dave Koberstein <davek@komacke.com>
Date: Tue, 31 Dec 1996 11:17:11 -0800
To: ss@tapr.org
Message-ID: <3.0.1.32.19961231111705.006ac058@sydney>
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Hmmm... Thinking of FEC at SS is interesting and I'll go with that. But
is it true that it will beat wideband thermal noise? As we add longer FEC
codes (increasing the number of errors we can correct for), we have to
increase the signaling rate (to keep the information rate constant). That
means wider bandwidths, more noise power, and worse S/N.

I don't know how to express what a given FEC code gives you for reduced bit
error rate. Can you comment on that?

At 06:16 AM 12/31/96 -0600, you wrote:
>>The advantage of DS and FH is resistance to relatively narrowband
>>interferors or relatively narrowband power loss (i.e. multipath). They
>>don't resist wideband thermal noise. To quote out of context: to do so
>>would violate the laws of physics. (Really, it would violate our current
>>understanding of information theory.)
>
>Unless you consider FEC to be a form of spread spectrum, in which case
>going wider *does* help you against wideband thermal noise. I know,
>the usual definition of spread spectrum doesn't include FEC, but I
>argue that they do look very much alike. In fact, DSSS can be seen as
>a special case of coding with a low-rate random code that has no
>gain as compared to a code chosen for good distance properties.
>
>Phil
>
> -------------------- End of Original ---------------------------------

____
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183. Re: [SS:762] Re: .. Process Gain

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 18:24:07 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701010224.SAA17835@servo.qualcomm.com>
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>In real world situations with some of these 1Mb + DS systems what is the
>likely doppler shift that these units can tolerate (very approximately)?

Doppler is less of a problem the faster you go. At megabit rates, it's
virtually a non-problem even on satellites. Note this applies to the
user data rate, not the chipping rate -- it's the post-despreading
bandwidth that counts. A wide post-despreading filter (as would be
used on a high rate link) will easily accomodate a lot of doppler
shift, as will the relatively wide carrier loop filters. At lower data
rates (and correspondingly lower C/N0 ratios) the data and carrier
loop filters are all much narrower, and are therefore much more sensitive
to doppler.

GPS is probably the worst case. The data rate is only 50 bps and there
is significant satellite and platform doppler shift (though the

satellite motion component is not nearly as great as it would be if the satellites were in low orbits). Acquisition from a cold start often takes as long as 15 minutes, largely because the receivers have to brute-force search a large three-dimensional space consisting of 32 PN codes (one for each satellite, though not all are in use) times plus & minus several kilohertz worth of 50Hz channels (doppler shift) times 1023 possible time offsets for the 1023-chip C/A code. It has to dwell on each point in the search space long enough to accumulate sufficient energy from the output to detect the signal. And even after it acquires a satellite, it takes a minimum of 30 seconds to collect a complete frame of time code and ephemeris information for that satellite.

"Warm start" reacquisition with a current ephemeris and clock can be pretty fast because the receiver can search only those PN codes that are known to be visible, and at the approximate doppler and timing offsets predicted by the last known satellite data, clock, and receiver position.

Phil

184. Re: [SS:764] Re: .. Process Gain

From: Phil Karn <karn@qualcomm.com>
Date: Tue, 31 Dec 1996 18:36:20 -0800 (PST)
To: ss@tapr.org
Message-ID: <199701010236.SAA17883@servo.qualcomm.com>
Rendered body type: text/plain

>Hmmm... Thinking of FEC at SS is interesting and I'll go with that. But
>is it true that it will beat wideband thermal noise? As we add longer FEC
>codes (increasing the number of errors we can correct for), we have to
>increase the signaling rate (to keep the information rate constant). That
>means wider bandwidths, more noise power, and worse S/N.

Yes, FEC will beat thermal noise -- to a point. That point is the Shannon limit for an infinite bandwidth channel: -1.6 dB Eb/N0. Note the units; Eb is the energy in joules per *user data bit* (NOT energy per chip, or energy per coded modulation symbol or anything else), and N0 is the thermal noise spectral density in watts/hertz. Since joules = watts/hz, the ratio is dimensionless.

Example: Qualcomm CDMA is a direct sequence spread system. The two directions (mobile to cell and cell to mobile) use different modulation schemes, but both use interleaved convolutional coding with Viterbi decoding, and their overall Eb/N0 performances are comparable: about 3-4 dB on a nonfading channel and about 7 dB on a fading channel. Most of the extra power required on a fading channel is because of the limited interleaving available due to delay constraints (this is, after all, a voice system).

Phil